

COAL AGE

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Madison Coal Corporation

General Offices, 910 South Michigan Blvd., Chicago

ADDRESS REPLY TO

Glen Carbon, Illinois, January 26, 1923.

Mr. J. J. Hughes,
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1508 Federal Reserve Bank Bldg.,
St. Louis, Missouri.

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Yours truly,

L. ECK

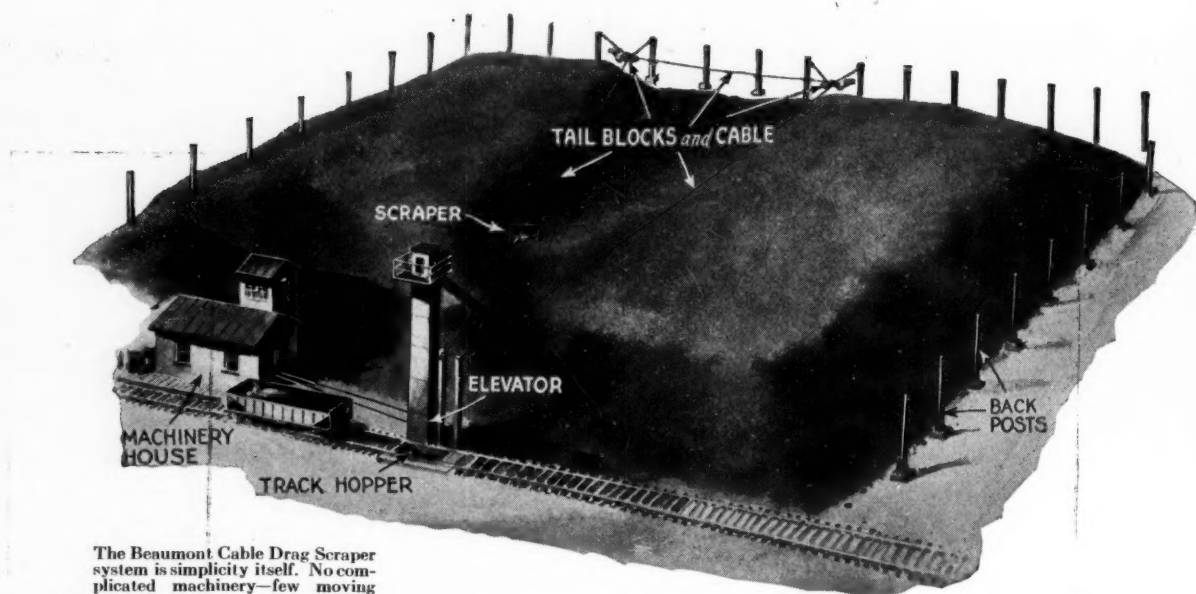

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COAL AGE

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C. E. LESHER, Editor

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Selective Immigration

IF THE immigration quotas of 1890 were restored and employers permitted to recruit their own labor under that quota, well-advised opinion is to the effect that the result would be in the public interest. Under such an arrangement immigration could be drawn largely from the north of Europe. It must be admitted that the government cannot undertake a selective process in a foreign country. Private employers, however, could look up the particular type of skill that they might need and in that way affect the selection of immigrants of the more desirable type.

For instance, this year there has been a great shortage of puddlers at American steel mills. On the other hand, there has been a surplus of this type of skill in Wales. Under the present law where the employer is prohibited from making any arrangement with a prospective employee in a foreign country, it is difficult to induce the average man to come to the United States and take a chance on obtaining employment. Many have not the resources to finance such a trip, yet they would be willing to come if expenses were advanced.

It is believed that any relief from the present immigration law will have to come along some such lines. There is no probability that Congress will take off the lid. Moreover, public sentiment is strongly opposed to any large increase in immigration since it is being learned that the public must take care of the unemployed in the off-peak periods.

A type of immigration and emigration that is coming in for considerable discussion is the interstate and inter-industry flow of labor. It is pointed out repeatedly that in the aggregate the soft-coal mines can spare thousands of mine workers without impairing their capacity to produce ample fuel for industry. The anthracite mines are perennially short handed and the metal mines want more men, as do many manufacturing industries. To meet in part this requirement negro labor from the South is flowing north, but the soft-coal mine worker is not leaving his part-time job in haste.

The reason, of course, that the steel industry, for instance, is short of labor while the bituminous-coal mines have a surplus is that the steel industry does not pay as high wages as does coal mining. Laws of Congress determine or at least set the limits on the influx of labor from across the seas, but economic laws govern the movement within the nation's borders.

It is more important to discuss how excess labor in one place may be induced to take up work where it is more urgently needed than to debate endlessly the question of how and why so many mine workers happen to be attached to the industry. The operators point out that the high wage and possibility of high earnings have and continue to attract men into digging coal, which is a reason suggesting a cure. The mine workers' official spokesmen do not deny this as a reason but merely say that if there are 200,000 excess men at the

soft-coal mines it is the operators' fault for giving them jobs—which line of argument gets nowhere.

The bituminous-coal industry attracts men to it because it pays well and to dig coal is to be one's own boss, that is to say, assures money and freedom. For no lesser reason do those from foreign lands crowd to these shores.

Why More Reason

In Settling Freight Rates Than Wages?

NO Surer evidence of normal conditions in the soft-coal trade could be had than the many complaints now before the Interstate Commerce Commission for readjustments in freight rates. Southern Ohio has a case before that body in which an increase in the differential between southern Ohio and West Virginia is sought as a direct means of increasing the market for Ohio coal. The operators in Colorado want more leeway on freight rates in the market to the east of them, Kansas seeks more of an edge on Illinois in Missouri Valley markets, Eastern shippers want better rates as compared with Illinois and Indiana into the Northwest, to mention a few of the outstanding cases before the Commerce Commission at this time.

Costs of production and freight rates determine quite rigidly the area in which coal from a producing field can be marketed. When demand and prices fall, orders decline, and with mines working but a few days a week—sometimes but a few days a month—the operators seek to extend their outlets, to get a larger share of the going business. Rate controversies are very expensive, statistical and legal services come high, but no expense is ever spared in waging a fight for lower rates or in defense of existent rates. Operators rally without question around their local associations and meet assessments willingly in the defense of such a cause. An equitable freight rate means a great deal to the life of a coal field.

The rate structure is a complicated affair, yet it is flexible. There are both general advances (or general reductions) and local changes. Inequalities are alleged, proved to the satisfaction of the rate-governing body and changed. Discrimination is prohibited. Through many years there have been evolved methods of ascertainment of such abstract things as density of traffic, earnings per ton-mile, costs and profits on specific transportation services. A great body of statistical record and of opinion has been built up on which contending parties may rely in seeking rate changes. It may almost be said that were a bar to be erected to further efforts to change coal freight-rate differentials, hope would die in the breast of the coal operator.

Yet that is what has happened with respect to that other important factor in the price at which the coal producer may sell his product. Labor represents between 60 and 70 per cent of the cost of mining and putting coal on the railroad cars. In the union fields

the wage rates and working conditions that together determine the labor cost of production have in recent years become solidified. There is no machinery in either the anthracite or the organized bituminous coal fields by which inequalities may be corrected. In the hard-coal region it is by agreement, by the contract dating from 1902, that differentials and details of working conditions have been so crystallized that no change is possible. In the soft-coal regions the union has set its face against any change that is not upward and uniformly applied. There is no present way of bringing to satisfactory negotiation the complaint, either of miners or operators, respecting wages or working conditions if the change desired will alter the earnings of either.

It is true that quite recently certain operators in an isolated field in Washington effected a new agreement with the mine workers' local that changed previously existing differentials and lowered the scale. The change was made, however, without the consent of the International organization. It was so obvious that if the union local had not agreed to what was an apparent necessity the district would have at once been made non-union that common sense prevailed in spite of Indianapolis, and a reduction was agreed to. The instance stands alone.

Now it is not conceivable that the relationships that exist between wages in different fields are perfect; that no improvement of advantage to either party is possible. Quite the contrary, for in 1920 these matters were introduced before the Robinson commission, particularly by the mine workers. The Robinson commission made no awards in this regard but it did recommend a commission within the industry to investigate machine differentials. The advice was never followed. So long as one side—now the United Mine Workers—is so powerful in its field with no organized resistance, there can be no collective bargaining.

It is possible to array facts with respect to discriminatory freight rates and come to a conclusion and force obedience to that conclusion, because there is a tribunal that has control of freight rates. What should be a proper wage rate should be as susceptible to argument and determination by reason as what should be a proper freight rate. The essential difference, of course, lies in the fact that the one is concerned with the wage of capital and the other with the wage of labor. Capital is now subject to the discipline of society; labor is not, although the time may come when it will be. Compulsory arbitration of freight rates came after a decade of discrimination and abuse in the railroad world, none of which could compare in blighting effect with the strikes of labor in 1922.

In the exchange of paper shot between the United Mine Workers and the Special Committee of the Bituminous Coal Operators—which our Washington correspondent advises this week is going over the heads of the Coal Commission—it is boldly proclaimed on the one hand that the cure for labor trouble in the coal industry is to unionize all the mines, while it is plainly intimated on the other hand that the union as a whole should be abolished. Neither, of course, is imminent.

To have industrial peace in the coal industry there must come a will to negotiate and to bargain collectively in every field where the union is a recognized factor. There must also be machinery to conduct negotiations and to enforce the results of the negotiations. The first step is a united front by the operators in the or-

ganized fields, for nothing less will force the United Mine Workers again to bargain. The machinery may be either within the industry or outside, as is the Railroad Labor Board. The preference is for arbitration and conciliation within the industry, and if there is to be any suggestion as to how it should be organized and function that suggestion must come from the operators. The question now is whether the Special Committee of Bituminous Coal Operators with its majority of anti-union sentiment can and will frame a constructive proposal for peace in the organized fields and rally the union operators to that plan.

Commodity Exchanges and Public Welfare

THERE is within the administration a powerful influence at work in favor of the produce and commodity exchange. These agencies are regarded as being vital to the continued welfare of many trades. Dealing in commodities on paper is a necessity, it is pointed out. Future trading, where there is actual delivery of the commodity, tends to diminish the volume of speculation in the business. These exchanges provide a hedge which is nothing more than an insurance on price, a very necessary procedure in modern business. Those who put in their time betting on supply and demand do an insignificant amount of economic harm. Even that is offset to a certain extent by the fact that these operators in their keenness make helpful deductions as to probable supply and demand. The sinister influence which is exerted in future trading is the buying of a position and the setting out to make it good. To do this, resort is had to efforts to spread the impression of shortages which do not exist.

These attempts to interfere with the ebb and flow of supply and demand are confined perhaps to 3 per cent of the volume of business done on exchange. Ninety-seven per cent of its operations are in the public interest, yet the 3 per cent brings the whole into disrepute. There is every reason why exchanges should adopt regulations which would preclude such tactics. Had the Chicago Board of Trade listened to public opinion ten years sooner, it might have escaped regulation. The broker has a professional obligation to the buyer and to the seller. He cannot be faithful to those obligations if he speculates on his own account. This is widely known, yet the exchanges have not had the courage to prohibit a certain minority from engaging in the unethical practice of dealing on their own account.

ALASKA WOULD GO AHEAD if the federal government were to get out, many believe. As it is, jurisdiction over the territory of Alaska is divided among 35 different departments and bureaus of the federal government, which represent 135 separate activities. Now that a number of prominent federal officials are planning a march on Alaska, it is hoped that steps will be taken that will give the people of that territory a chance to develop it. There is a large and thriving paper and pulp industry across the imaginary line which separates Alaska from Canada. The industry is largely in the hands of Americans, who are forced out of Alaska by the curious conception of conservation which seems to have as its objective that there be no development anywhere—that water capable of developing power should continue to waste itself on the rocks of its stream bed and that trees should continue to age and fall down.

Panther Creek District Mines Thickest Coal Found In Pennsylvania Anthracite Region

Steep Pitches Make Gravity Underground Loading So Easy That Output per Miner Is High—Maintenance Is Costly — Depth Increases 88 Per Cent in Fifty Years

BY DEVER C. ASHMEAD
Kingston, Pa.

THE thickest coal in the Pennsylvania anthracite region is mined in the Panther Creek district and steeply pitching beds make gravity loading underground so general that the output per miner is far higher than that of any other district. However, in spite of thicknesses running up to 200 ft. and averaging

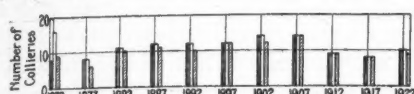


FIG. 50—NUMBER OF COLLIERIES CONSIDERED IN THE CALCULATIONS

This diagram shows the actual number of collieries used in the depth, thickness and tonnage calculations. The first column shows the collieries reporting depth and thickness and the last column in each period shows the number of collieries used in making the tonnage calculations. The center column shows the number of collieries reported by the state mine inspectors in their annual reports. These figures were determined by simply counting the collieries in each case.

15.87 ft. and in spite of the high average of 641 tons loaded out per day for every miner, the general tendencies of the Panther Creek district through fifty years of mining are about the same as those of the rest of the

anthracite region. Beds have been thinned an average of 22 ft., the average depth has increased 88 per cent and production per employee has dropped markedly.

The Panther Creek district, for the purposes of this article, is that group of mines in the tip of the Southern anthracite field that lies east of the Schuylkill River together with a few collieries in the same field just

NOTE.—This is the fifth in a series of articles by Mr. Ashmead describing conditions in the seven sections of the Pennsylvania anthracite region. Previous articles appeared in *Coal Age* for Feb. 22, March 22, April 5 and May 10. The sixth will appear soon.

across the river to the west. This district includes comparatively few collieries, but data on them is practically complete, as shown in Fig. 50, except for the first period of the last half century. Therefore the figures paint a good picture of what has happened in the past and lend basis for accurate deductions.

TABLE XL—NUMBER OF PANTHER CREEK COLLIERIES IN THIS SURVEY

Years	Reported by Mine Inspectors	Having Depth and Thickness Data	Used in Tonnage Calculations
1872	16	8	9
1877	8	8	6
1882	11	11	10
1887	12	12	11
1892	12	12	10
1897	12	12	12
1902	14	14	12
1907	14	14	14
1912	9	8	9
1917	8	8	8
1922	10	10	9

The same physical characteristics that are found in the Eastern Middle district mark the Panther Creek field, but they are not so pronounced. For this reason the field is considered, geologically speaking, a part of the Eastern Middle field. The Panther Creek district has been subjected to great stresses and a very deep V-shaped basin has resulted. This makes the beds lie on planes varying from level to vertical and in places they are completely overturned. Fig. 51, which is a cross-section in the vicinity of the Lansford Tunnel, shows how steep these pitches are. The section shows the Summit Hill basin in relation to the main basin. The famous Summit Hill mine fire has been burning nearly fifty years in this section.

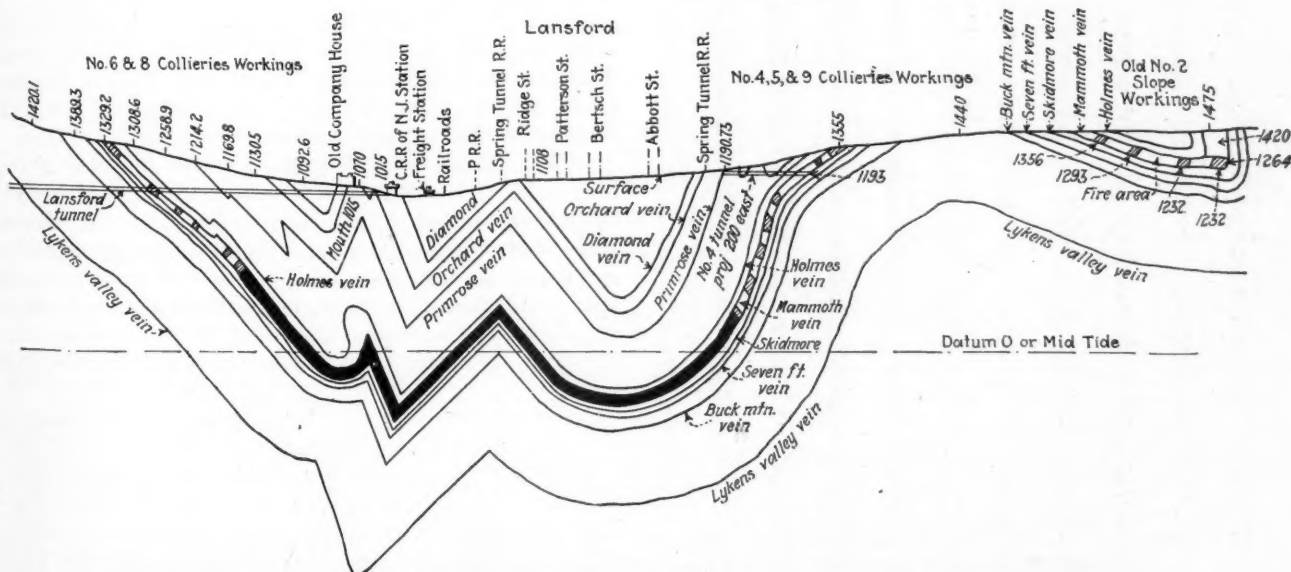


FIG. 51—A CROSS-SECTION OF THE PANTHER CREEK DISTRICT TAKEN IN THE VICINITY OF THE LANSFORD TUNNEL; SUMMIT HILL BASIN ON RIGHT

This cross-section shows the general character of the measures in the Panther Creek district. The beds of coal are generally very steeply pitching and in places they are vertical and lie back on themselves. This complicates the mining.

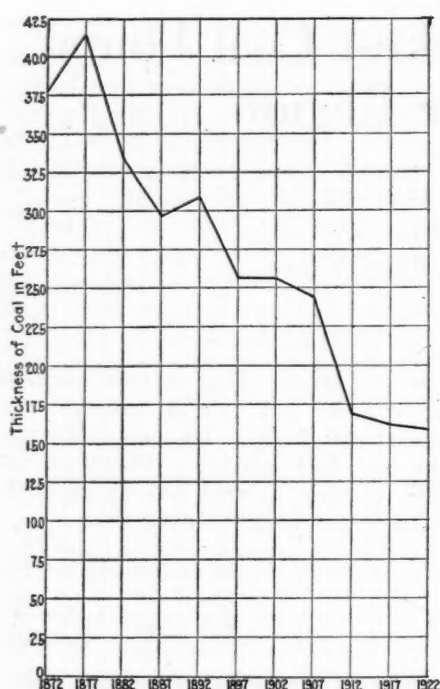


FIG. 52—AVERAGE THICKNESS OF THE BEDS OF COAL IN THE PANTHER CREEK DISTRICT

For the method of calculating this curve turn to Fig. 3 in Part I of this series of articles (*Coal Age*, Vol. 23, p. 324). Table XLI gives the points on the curve.

ard, Primrose, Holmes, Mammoth, Skidmore, Seven Foot, Buck Mountain and Lykens Valley and some smaller beds, which probably are splits of those mentioned. Some of these beds have not been proved to their greatest depth, hence it is impossible to state that they all exist in a workable condition.

Whether these thick beds are assets or liabilities depends entirely upon the mining methods that must be adopted to work each one. A thick bed from which the surface may be removed and the coal mined by steam shovels naturally is a very great asset, but a thick bed which has to be mined by breasts may be a liability, for the cost of the necessary protection of the hanging wall may more than offset every possible econ-

Some of the coal beds reach their maximum in the Panther Creek district. The Mammoth bed in places is 200 ft. thick and in one place it has been so folded that the two arms of the "V" come together and the total thickness of the bed reaches 400 ft. This coal is now being removed by stripping. Formerly it was mined by the old breast method. In this district, from the surface downward will be found beds in this order: Diamond, Orch-

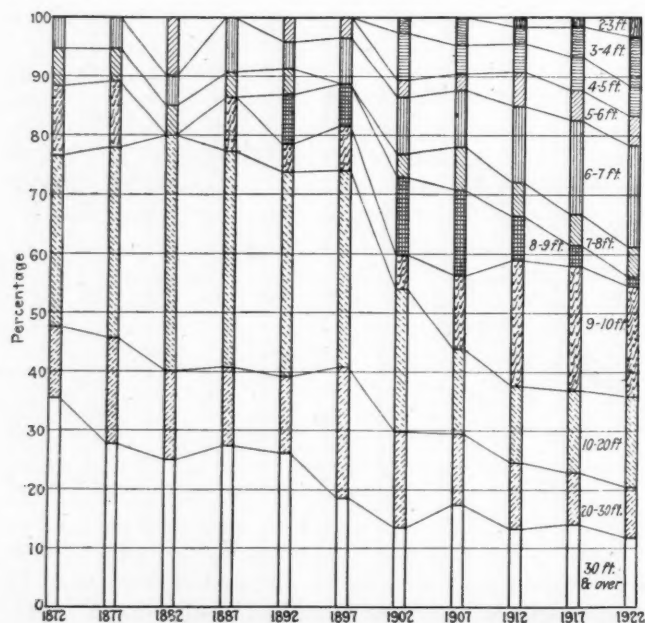


FIG. 53—PERCENTAGE DISTRIBUTION OF BEDS BY THICKNESS IN PANTHER CREEK DISTRICT

TABLE XLI—THICKNESS AND DEPTH AVERAGES FOR PANTHER CREEK DISTRICT

Years	Thickness of Beds	Depth of Workings	Years	Thickness of Beds	Depth of Workings
1872	37.86	337	1902	25.53	634
1877	41.50	445	1907	22.45	569
1882	33.35	468	1912	16.85	534
1887	29.70	475	1917	16.21	589
1892	30.90	507	1922	15.87	630
1897	25.58	616			

omy. The steep pitches and thick beds may mean that serious squeezes may result and areas of coal may be lost or badly damaged.

In the early days most of the coal was procured from water-level tunnels, and only the cream of the coal in the Mammoth and one or two other beds was taken. The remaining beds were not considered worth going after, as the easily attainable coal was considered inexhaustible. The adoption of anthracite for domestic purposes so increased the demand that the coal companies began to realize the value of the other beds.

The old method of taking only the cream of the coal was abandoned; for by that method disturbances of the beds were likely to occur ruining the thinner upper beds by squeezes and causing loss of the coal remaining in the beds under operation. Fig. 52 indicates that in 1872 the average thickness of the coal beds was 37.86 ft. and that in 1887 it had increased to 41.50 ft. It was not until after that

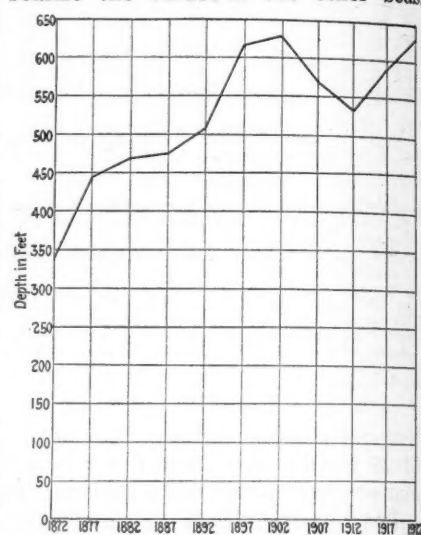


FIG. 54—AVERAGE DEPTH OF WORKINGS IN PANTHER CREEK DISTRICT

By five-year periods commencing with 1872 the weighted average depth of workings in the district is shown. The method of obtaining this weighted average depth is shown in the footnote to Fig. 5 in the first of this series of articles (*Coal Age*, Vol. 23, p. 325). In Table XLI will be found the figures from which this curve was plotted.

period that the thinner beds began to be worked. From 1877 the curve declined rapidly. By 1922 the average thickness had decreased to 15.87 ft. Today, Panther Creek operators work nine beds instead of only the Orchard, Primrose and Mammoth beds, as in 1872.

In Fig. 53 is shown the proportionate increase of thin beds mined. In 1872 not a single bed less than 6 ft. thick was worked. Those that might be called thinner beds—between 6 and 8 ft. thick—are really splits of much thicker beds according to reports from coal companies and therefore might properly be assigned greater

TABLE XLII—TONNAGE PRODUCED PER BOILER HORSEPOWER AND PER ENGINE HORSEPOWER IN THE PANTHER CREEK DISTRICT

	Boiler Horsepower Installed	Engine Horsepower Installed	Tons of Coal Produced per Boiler Horsepower	Tons of Coal Produced per Engine Horsepower
1877	2,340	3,030	0.88	0.68
1882	3,780	7,611	.48	.24
1887	6,480	.....	.63	.....
1892	8,850	.....	.66	.....
1897	13,640	.....	.60	.....
1902	17,337	.....	.48	.....
1907	25,389	28,930	.54	0.47
1912	29,162	38,571	.48	0.36
1917	17,372	29,209	.80	0.47
1921	16,123	.....	.99	.....

thicknesses than those given in this paper. In 1872 exactly 76.5 per cent of the beds being worked were more than 10 ft. thick, and this proportion was maintained until 1897. At this point there was a considerable drop, due to the opening of a new colliery working thin beds by modern methods, taking practically all of the coal instead of only working the best beds.

From 1897 the percentage of the thick beds continued to drop steadily and by 1922 this percentage was down to 35.5. Not until 1902 were beds thinner than 5 ft. worked. But by 1912 beds even as thin as 2 ft. were opened. Naturally the character of mining in this district changed materially.

As was to have been expected, the average depth of Panther Creek has increased—88 per cent in fifty years. Workings show a steady increase, according to Fig. 54, until 1902. This increase is from 335 ft. in 1872 to 634 ft. in 1902, or 299 ft. In the period 1902 to 1909 workings averaged shallower for two reasons. New beds were opened at higher levels and new operations at the edge of the district were begun. This same condition applies to the next period. The data indicated that during the labor disturbances in 1902 some of the deeper workings were flooded and therefore work in them was temporarily discontinued. From 1912 to

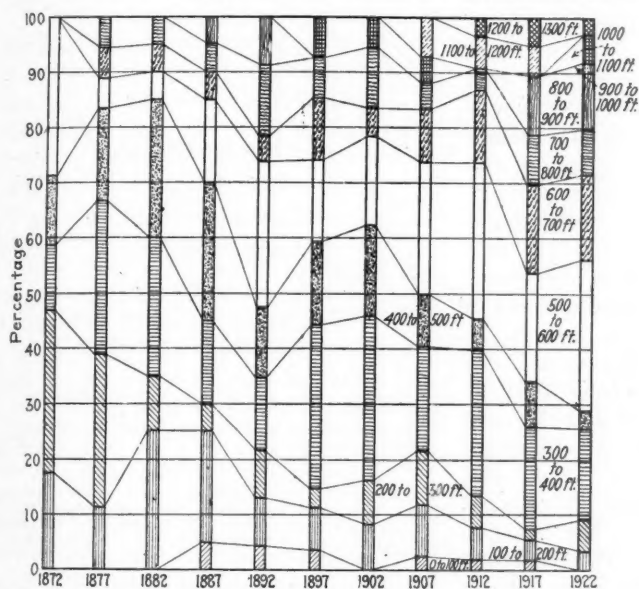


FIG. 55—PERCENTAGE OF BEDS BY 100-FT. INTERVALS
The method of calculating this curve is described in the footnote to Fig. 6 in the first of this series of articles.

1922 the depth of the workings again increased and by 1922 they had reached a mean depth of 630 ft., this being a few feet less than the average depth of 1902.

In Fig. 55 the percentage of producing beds by 100-ft. depth intervals is shown. In 1872 there were no workings below the 500- to 600-ft. interval, but in 1922 only 56 per cent of the beds being mined were as shallow as 600 ft., and the deepest in the 1902 to 1922 period were 1,200 ft. and 1,300 ft. None below 1,000 ft. was worked until in 1907.

What happened in each 100-ft. interval is evident in Fig. 56. Probably the most interesting interval is that of the top 100 ft. Here there has been a considerable increase in the average thickness of the workings due to the opening up of the strippings. The figure shows no workings of this depth for 1922 because active strippings have penetrated as deep as 200 ft. in places though operations at various levels clear up to the surface are in progress.

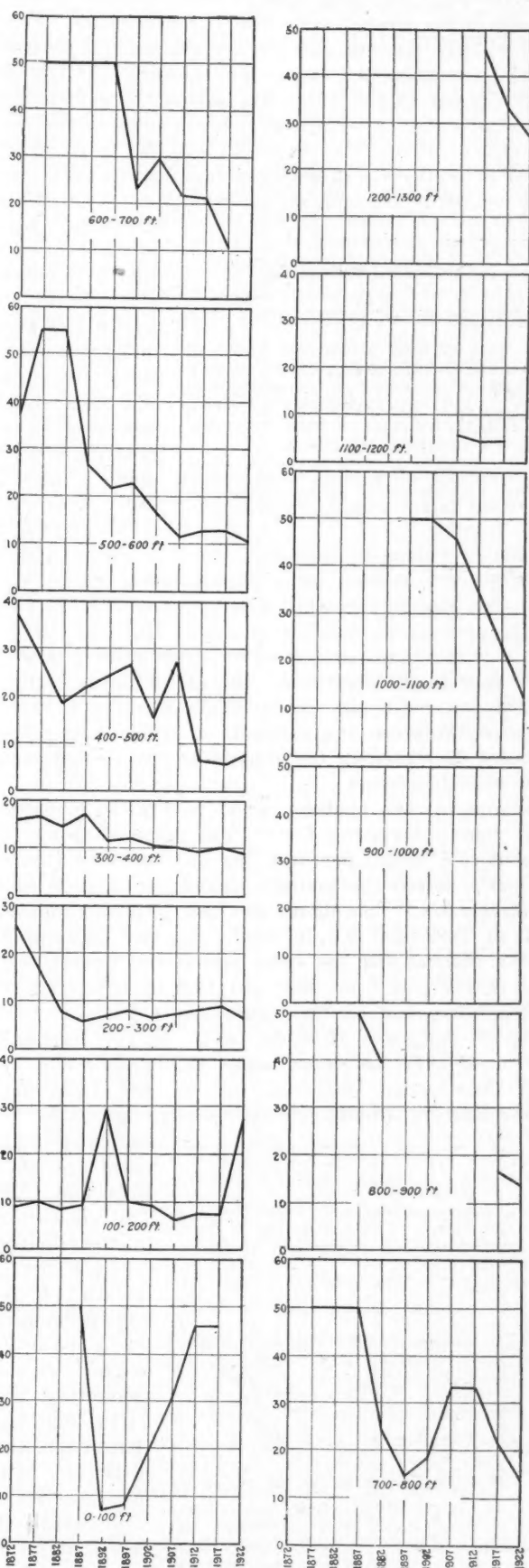


FIG. 56—AVERAGE THICKNESS OF BEDS AT EACH 100-FT. INTERVAL DEPTH BY FIVE-YEAR PERIODS IN THE PANTHER CREEK DISTRICT

The description of the method used to calculate these curves will be found in the description accompanying Fig. 7 in the first of this series of articles. New strippings have made the record for shallow coal show a big increase in coal thickness.

In the Panther Creek district there is a considerable change in the power curve covering fifty years. From 1877 to 1912 the curve shows a slight general decrease in coal produced per boiler horsepower, as might be expected, but in the 1912-1917 period there is a very sharp increase. An increase is also shown in the next period. This does not mean that any less boiler horsepower is required to produce the coal, for the conditions have not improved, and, as has been shown by both the

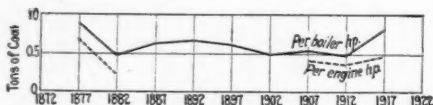


FIG. 57—CURVE SHOWING TONS OF COAL PRODUCED PER BOILER HORSEPOWER AND ENGINE HORSEPOWER, BY FIVE-YEAR INTERVALS, 1877 TO 1921, IN THE PANTHER CREEK DISTRICT

The full method as to how these curves was calculated will be found in the footnote to Fig. 8 in the article in this series relating to the Lackawanna County district.

simple. Previous to 1917 the largest company in this district constructed a large central power station and from this station furnished a large amount of the electricity used in the mining of coal. The steam boiler plants at the mines were used to furnish power to such units as were not electrified. The coal company sold the central station to the Pennsylvania Electric & Power Co. and therefore the amount of boiler horsepower installed decreased in the reports to the Pennsylvania state mine inspectors.

A study of the haulage curves in Fig. 58 brings to light some interesting facts. The curve showing the tons of coal hauled per mule per day indicates that in the early period the tonnage hauled per mule is comparatively low. This figure was only 12.5 tons in 1877, 11.1 in 1882 and 9.6 in 1887. In the Lackawanna county district for the same period the figures were 18.0 in 1877, 12.7 in 1882 and 14.9 in 1887. In the Wilkes-Barre district the figures were 20.32 in 1877, 16.30 in 1882, and 15.93 in 1887. In the Nanticoke district in 1877 the mules hauled 19.54 tons a day. In 1882 they hauled 16.27 tons and in 1887, 15.81 tons. In the Eastern Middle field the tonnage figures for the

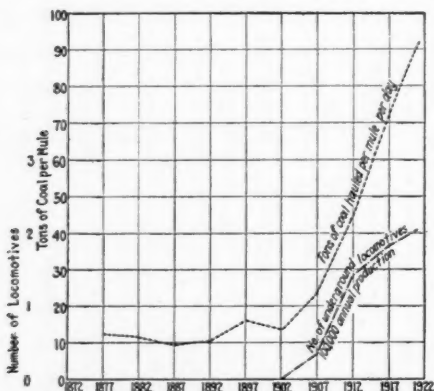


FIG. 58—TONS OF COAL HAULED PER MULE PER DAY AND NUMBER OF UNDERGROUND LOCOMOTIVES PER 100,000 TONS OF COAL PRODUCED PER YEAR IN THE PANTHER CREEK DISTRICT BY FIVE-YEAR PERIODS FROM 1877

Tables XLIV and XLV give the data and the final points shown in this curve. The method of making these calculations is described in the footnote to Fig. 9 in Part I of this series of articles.

thickness and depth curves, the thickness and depth are both following along normal lines. That is, the thickness of measures is decreasing and the depth is increasing. The explanation is

corresponding years are 20.77, 15.10 and 12.56. This shows that in the Panther Creek district the daily tonnage per mule is very low, in many cases amounting to only one-half that of the other districts. This may possibly be explained by the fact that in the earlier years there were a large number of small openings and the coal had to be hauled

TABLE XLIII—MULE AND LOCOMOTIVE HAULAGE IN PANTHER CREEK DISTRICT

Year	Tons of Coal Hauled Per Mule Per Day	Number of Underground Locomotives Per 100,000 Tons of Coal Produced Per Year	Year	Tons of Coal Hauled Per Mule Per Day	Number of Underground Locomotives Per 100,000 Tons of Coal Produced Per Year
1877	12.5	....	1902	13.8	....
1882	11.1	....	1907	23.7	0.37
1887	9.6	....	1912	44.7	1.42
1892	10.8	....	1917	73.7	1.83
1897	16.1	....	1921	90.7	2.03

by mules from these scattered openings to the breakers. This ran the production per mule per day down.

The figures are extremely deceptive, however, for in this district it is estimated that for every ton of coal hauled one ton of rock has to be hauled. Therefore it is possible that the figures should be increased 100 per cent, which would bring them more nearly in line with those of the other districts. In this district it is possible to calculate the effect of the electric locomotive on the haulage of coal. From the mule-haulage curve in Fig. 58 it is reasonable to assume that if the underground electric locomotive had not been introduced in the earlier years the output per mule by the periods would have been as follows: In 1887, 10 tons; 1892, 11 tons; 1897, 13 tons; 1902, 16 tons; 1907, 19.5 tons; 1912, 23 tons; 1917, 26 tons; and in 1921, 29 tons. If this curve is true, then the tons of coal hauled per underground locomotive in 1907 was 160.6 tons, in 1912 61.6 tons, in 1917, 90.2 tons, and in

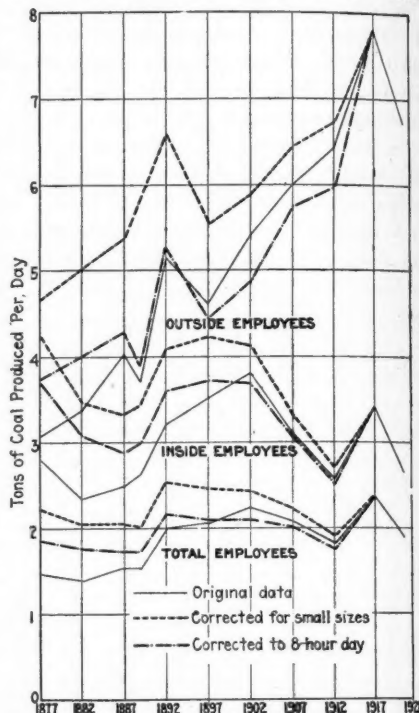


FIG. 59—AVERAGE DAILY PRODUCTION PER EMPLOYEE IN THE PANTHER CREEK DISTRICT, 1872-1921

The solid line represents the actual figures, the dash line gives the correction for small sizes and the dot and dash line gives the final corrected line for the time factor. This bases the output on the eight-hour day in order to make a proper comparison. The methods used in the calculation of these curves is given in the footnote to Fig. 10 in the article in this series that appeared in *Coal Age*, Feb. 22, page 327. The figures obtained for 1897 and 1912 were so far from the average of the curves that it was necessary to check them to see if they were correct. Points were then calculated for the years 1896 and 1898, and for 1911 and 1913 and averaged to obtain the figures for 1897 and 1912 respectively. These figures were then used instead of the actual figures for these years. It was not possible to obtain figures for miners and miners' laborers for the year 1887 for this district, so the year 1888 was used in place of it. This accounts for the extra point appearing in this set of curves.

1921, 29 tons. If this curve is true, then the tons of coal hauled per underground locomotive in 1907 was 160.6 tons, in 1912 61.6 tons, in 1917, 90.2 tons, and in

TABLE XLIV—NUMBER OF MULES AND LOCOMOTIVES IN PANTHER CREEK DISTRICT

Year	Number of Mules	Number of Underground Locomotives	Year	Number of Mules	Number of Underground Locomotives
1877	164	..	1902	601	..
1882	164	..	1907	574	15
1887	424	..	1912	310	59
1892	543	..	1917	189	76
1897	590	..	1921	175	94

TABLE XLV—TONNAGE PRODUCED AND WEIGHTED AVERAGE DAYS WORKED IN PANTHER CREEK DISTRICT

Year	Tons of Coal Produced	Weighted Average Days Worked	Year	Tons of Coal Produced	Weighted Average Days Worked
1877	352,424	180	1902	1,181,170	123
1882	763,883	226	1907	3,563,655	252
1887	1,093,753	203	1912	3,649,717	234
1892	1,358,562	224	1917	4,934,249	290
1897	1,795,404	164	1921	4,125,863	260

1921, 113.8 tons. The amount of rock handled is not included in these figures.

The great effect of the introduction of the locomotive is shown in the number of mules used at the mines. In 1902 there were 602 mules at collieries and by 1921 this number had decreased to 175, though a number of new collieries had been opened, which normally would tend to increase the number of mules used in haulage.

In the lowest set of curves in Fig. 59 there is shown the daily output of coal per employee. The solid line, which represents the actual figures as calculated from the mine inspectors' reports indicates a condition entirely different from any described in previous articles in this series. Here from 1887 to 1902 there is a steady increase in the output per man, then a drop from 1902 to 1921. In this case the figures for 1897 are corrected as explained in the caption to Fig. 59.

This does not tell the whole story, however, for when the curve is corrected for small sizes, which were not shipped in the earliest years, there is a considerable decrease in the output from 1877 to 1889. Then there appears an increase to 1902, and from that date to 1921 a steady decrease, with the exception of the war year, 1917, when the output took a jump. When corrected for the time element, from 1892 to 1921 there is only a slight decrease in the output per man from 2.16 tons in 1892 to 1.89 tons in 1921. There seems to be a step in the curve in 1889, which probably was caused by a change in mining conditions.

Comparing the figures in Table XLVI with those of the previously described districts, it is found that in Lackawanna County district the decrease was from 2.53 tons in 1877 to 1.74 tons in 1921. In the Wilkes-Barre district the decrease was from 2.12 tons in 1877 to 1.48 tons in 1921. In the Nanticoke district the decrease was from 2.56 tons in 1877 to 2.02 tons in 1921 and in the Eastern Middle coal field the decrease was from 2.81 tons in 1877 to 1.95 tons in 1921.

If the figures for the Panther Creek district are accepted for 1877, then there was a production in that year of 1.86 tons per employee as against a production of 1.89 in 1921, thus indicating a slight increase as against a reduction in all of the other districts. This

TABLE XLVI—AVERAGE DAILY PRODUCTION OF ANTHRACITE PER EMPLOYEE, PANTHER CREEK DISTRICT
(In Gross Tons)

Year	Per Total Employee			Per Inside Employee			Per Outside Employee		
	Re-ported	Cor-rected for Small Sizes	Cor-rected to 8-Hr. Day	Re-ported	Cor-rected for Small Sizes	Cor-rected to 8-Hr. Day	Re-ported	Cor-rected for Small Sizes	Cor-rected to 8-Hr. Day
1877	1.47	2.22	1.86	2.81	4.25	3.71	3.07	4.65	3.72
1882	1.38	2.05	1.75	2.34	3.47	3.09	3.37	5.00	4.00
1887	1.54	2.05	1.73	2.48	3.32	2.88	4.00	5.36	4.29
1889	1.53	2.02	1.73	2.61	3.44	2.99	3.69	4.87	3.89
1892	1.99	2.54	2.18	3.21	4.09	3.59	5.16	6.58	5.26
1896	1.91	2.33	1.97	3.29	4.02	3.54	4.26	5.20	4.16
1897	2.44	2.94	2.48						
1898	2.15	2.56	2.16	3.74	4.45	3.91	4.95	5.89	4.71
1902	2.24	2.43	2.10	3.81	4.13	3.69	5.42	5.88	4.87
1907	2.08	2.23	2.04	3.09	3.32	3.07	6.00	6.44	5.73
1911	1.90	2.00	1.83	2.71	2.86	2.65	6.22	6.56	5.84
1912	1.69	1.77	1.64						
1913	1.76	1.83	1.69	2.43	2.53	2.38	6.59	6.86	6.10
1917	2.37	2.37	2.37	3.41	3.41	3.41	7.82	7.82	7.82
1921	1.89	1.89	1.89	2.62	2.62	2.62	6.72	6.72	6.72

increase probably was due to the consolidation of properties and breakers and the introduction of modern haulage systems which reduce the force necessary to produce the coal.

The middle set of curves shows the daily output per inside employee. It decreased from 1877 to 1882, increased from 1882 to 1902 and then decreased again to 1921. Correcting for small sizes and the time element does not materially change the shape of the curve. The curve itself looks like the symbol expressing the cycle in electricity.

In the seventies and the eighties most of the coal was produced from the water level tunnels. In the late

eighties more of it came from the deeper workings. The work was more concentrated and fewer men were required and therefore production increased. In 1902 there was a complete overturn in the production. It decreased as far as the curve goes. Later in this series of articles this decrease in production possibly can be accounted for when the general conditions in the regions are discussed. The uppermost set of curves in Fig. 59 shows what has happened to the output per outside employee. Here, with the exception of the year 1892, there has been a steady increase in the

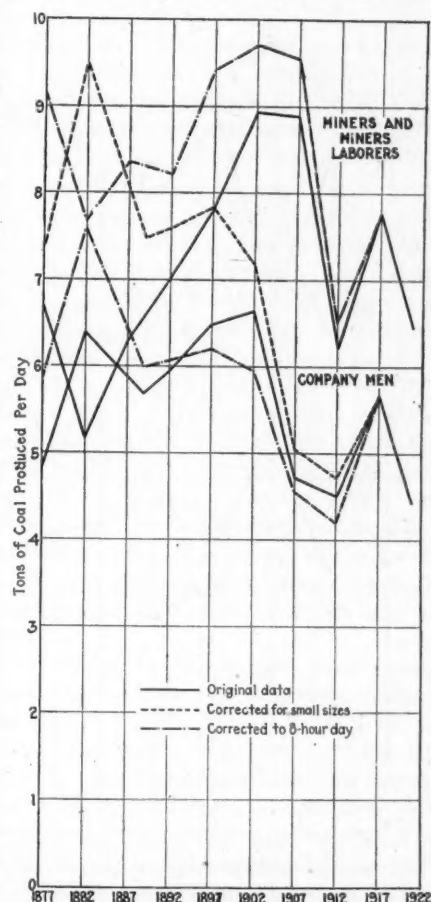


FIG. 60—AVERAGE DAILY PRODUCTION PER INSIDE EMPLOYEE FOR THE PANTHER CREEK DISTRICT, 1877-1921

The methods used in the calculation of this curve will be found in the footnote to Fig. 11, in the first article of this series, which appeared in *Coal Age*, vol. 23, p. 328. The correction for the years 1897 and 1912 will be found in the description to Fig. 59 in this article, as also will be found the reason for the use of the year 1889.

production per employee. This was to have been expected, as there has been a number of consolidations of collieries and therefore of breakers, and in some places new breakers have been built. In this district are found some of the most modern breakers in the whole anthracite region. Consolidation of collieries not only reduces the number of breaker employees but also decreases the other outside employees. Greater economies are possible, so there is an increase in the amount of coal produced per outside employee.

From Fig. 60 it will be observed that the output per miner and miner's laborer decreases to 1882, increases to 1902 and then drops steadily until 1921, with the exception of the year 1917. The increase in production from 1882 to 1902 was in the face of a decrease in the

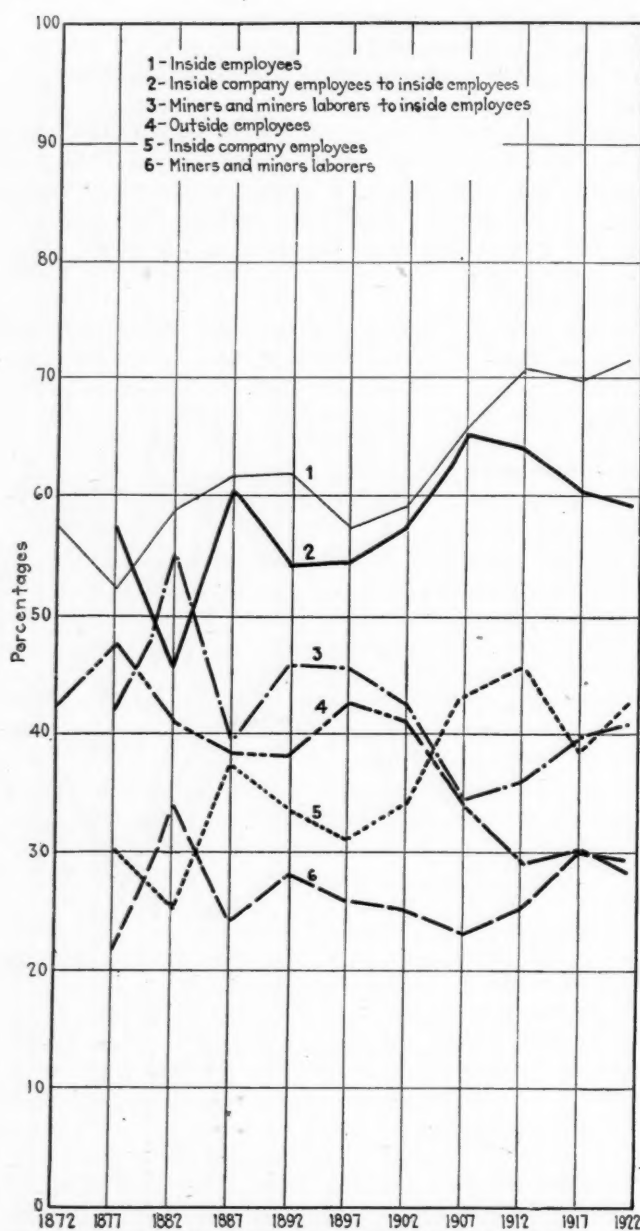


FIG. 61—PERCENTAGES OF EMPLOYEES BY CLASSES IN THE PANTHER CREEK DISTRICT

The data from which these curves were calculated will be found in Table XLVIII.

thickness of the workings, as is shown in Fig. 52. It is generally believed in this district that, owing to maintenance costs, the thicker beds are the more difficult to work. Perhaps, however, the miner and miner's laborer partly compensate for this by greater output.

The general reduction in the thickness of the beds continued after 1902. This might logically have continued to increase the output per miner and miner's laborer, but actually the output dropped. If production varies with bed thickness, then what is the most economical thickness of bed to be worked? Is it 25.5 ft., as is shown in the thickness curve, or is it some other figure, or does the thickness have no material effect on the production? No positive answer can be made, but it is probable that production variations in the Panther Creek district were not due to changes in bed thickness but to other causes which are not local but general and will be discussed later.

Other interesting data are disclosed by comparing this curve with similar curves for districts previously discussed. The district figures for daily production per miner and miner's laborer were: Lackawanna, in 1877,

TABLE XLVII—AVERAGE DAILY PRODUCTION OF INSIDE MEN (In Gross Tons)

Year	Miners and Miners' Laborers		Inside Company Men		Corrected for the 8-Hr. Day
	Reported	Corrected for Small Sizes	Reported	Corrected for Small Sizes	
1877	6.70	9.17	4.85	7.33	5.86
1882	5.17	7.67	6.39	9.49	7.59
1887	6.27	8.35	4.11	5.48	4.38
1889	5.28	5.98	5.68	7.48	5.98
1892	7.00	8.22	5.94	7.58	6.06
1896	7.34	8.98	5.94	7.25	5.80
1898	8.24	9.81	7.03	8.37	6.59
1902	8.94	9.70	6.63	7.19	5.95
1907	8.88	9.54	4.72	5.07	4.57
1911	5.62	5.93	5.20	5.48	4.88
1913	6.78	7.06	3.78	3.94	3.51
1917	7.76	7.76	5.67	5.67	5.67
1921	6.41	6.41	4.43	4.43	4.43

6.21 tons and in 1921, 3.51 tons, a decrease of 43.7 per cent; Wilkes-Barre in 1877, 6.58 tons and in 1921 3.76 tons, a reduction of 42.9 per cent; Nanticoke in 1877, 8.83 tons and in 1921, only 4.04 tons, a decrease of 54.2 per cent; Eastern Middle coal field in 1877, 7.03 tons and in 1921, 4.39 tons, a reduction of only 37.9 per cent. However in the Panther Creek district in 1877 the production amounted to 9.17 tons and in 1921 this had decreased 27.9 per cent to 6.41 tons. This is the least reduction among all the districts.

At the same time the production per man was considerably higher than in any of the other districts. This shows that more coal can be produced per miner and miner's laborer in the steeply pitching districts than in the flatter beds, because the miner does less hand loading. Were it not for other factors entering into the cost of production, it would seem that the Panther Creek district's costs should be lower.

The other set of curves in Fig. 60 shows the daily production per inside company employee. Here, generally speaking, there is a steady decrease in the output per man. This is caused by the increasing amount of underground maintenance and the greater supervision given the work.

Fig. 61 and Tables XLVIII and XLIX show the number of each class of employees and also the percentage relationship of these employees to the total number of employees. Comparing these curves with similar ones for the other districts it will be noted that the number of inside company employees has greatly increased, a factor counterbalancing the large output per miner and miner's laborer and increasing the mining cost.

TABLE XLVIII—MEN EMPLOYED IN PRODUCTION OF ANTHRACITE IN THE PANTHER CREEK DISTRICT

Year	Total Employees	Inside	Outside	Miners and Miners' Laborers	Inside Company Men
1872	1,710	981	729	.....	.....
1877	1,335	696	639	.....	.....
1882	2,446	1,444	1,002	.....	.....
1887	3,506	2,170	1,336	858	1,312
1892	3,061	1,895	1,179	870	1,025
1897	4,491	2,571	1,920	1,170	1,401
1902	4,294	2,523	1,771	1,074	1,449
1907	6,942	4,588	2,354	1,593	2,995
1912	9,244	6,551	2,693	2,360	4,191
1917	7,174	4,993	2,171	1,989	3,004
1921	8,423	6,058	2,364	2,474	5,584

TABLE XLIX—PERCENTAGE OF GIVEN CLASSES OF EMPLOYEES TO TOTAL EMPLOYED

Year	Inside	Outside	Miners and Miners' Laborers	Inside Company Men	Miners and Miners' Laborers (a)	Inside Company Men (a)
1872	57.3	42.7	.....	.....	.....	.....
1877	52.2	47.8	21.9	30.3	42.0	58.0
1882	59.2	49.8	34.2	25.0	55.3	44.7
1887	61.8	38.2	24.4	37.4	39.5	60.5
1892	61.9	38.1	28.4	35.5	45.9	54.1
1897	57.2	42.8	26.0	31.2	45.5	54.5
1899	59.0	41.0	25.0	34.0	42.5	57.5
1902	66.1	33.9	23.0	43.1	34.7	65.3
1907	66.1	29.2	25.5	45.3	36.0	64.0
1912	70.8	30.4	30.3	38.6	39.8	60.2
1917	69.6	30.4	29.3	42.6	40.8	59.2
1921	71.9	28.1	29.3	42.6	40.8	59.2

(a) Percentage to inside employees.

Why Fans Often Cease to Give Satisfaction and Frequently Take Excessive Power to Drive*

Equivalent Orifice of Fan and Mine Should Be Equal—If Fan Delivers More Air Than Pressure Will Circulate Through Mine, Air Will Back Out of Fan—Changing Fans as Mine Develops

BY J. R. ROBINSON
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FOR a number of years I was engaged in the designing, manufacture and installation of mine fans of the Guibal type. At that time it was customary for mining companies to order a fan of a certain wheel diameter—10 ft., 16 ft., 20 ft. or perhaps 25 ft.—accompanying the order by a specification as to the quantity of air the fan was supposed to deliver. The water gage, or pressure, rarely was considered. The diameter of wheel seemed to be the determining factor in the purchase and installation of the fan. The bigger the wheel the more air was the usual thought in the mind of the purchaser.

These fan installations sometimes proved satisfactory, but in most cases they did not. Sometimes the installation met all expectations when first made, but in a few years it became entirely unsatisfactory. The purchaser would sometimes praise the fan highly when it was first installed and a few short years later would "cuss out" the fan and the maker because the ventilation afforded by the fan was unsatisfactory. Little seemed to be known as to the reasons why a fan should be effective when first installed and then become wasteful and inefficient after a few years' use.

Everyone seemed to be puzzled by these phenomena. The best makes of fans were being alternately praised and blamed, one mining man swearing by a certain maker and another swearing at him.

At the time to which I refer, the Guibal fan was generally made of wood, except the shaft, boxes and spiders, and owing to its light construction it was incapable of creating high pressures. About the same time the Capell fan was coming rapidly into use. It was a steel fan and capable of creating a much higher pressure than the wooden Guibal fan. This Capell fan frequently failed to do what was expected of it. The installation was made with the understanding that it would deliver a certain quantity of air, but when the trial was made the fan failed to produce that quantity. Then arguments begun, neither the maker nor the purchaser having a clear idea of why the quantity of air was deficient. In my conversation with the American representative I was unable ever to learn why his fan had failed to perform as expected. If he knew, he wouldn't tell.

I have spent much time studying his work as well as my own and others, and I believe he never alighted on the real reason why his fan failed to deliver as much air to the mine as was expected. His want of knowledge probably accounted for his hostility to those who showed dissatisfaction with his work. As he was considered the best man to go to for help in mine-ventilation problems and in the application of fans to mines, when I found he was working with empirical formulas and did

not really understand the fundamental principles of the work of the fan in the mine, I determined to find out for myself what these fundamental principles were.

During my investigations I found that an ordinary centrifugal fan of any or all designs and makes, when applied to a new mine, invariably passed its air through itself without backing any of the air from the intake orifice, and that often after a few years of mine development the fan began to back out some of the air; as the mine kept on developing this condition got worse and worse, and finally the fan wheel went to pieces and a new fan was required.

I also observed that when first installed a fan would pass through the mine, let us say, 50,000 cu.ft. per minute at a $\frac{1}{2}$ -in. water gage and that after a few years when speeded up it would pass through the mine, let us say, 70,000 cu.ft. per minute at a 2-in. water gage. Now, the speed of the fan necessary to produce 2 in. of water gage is exactly twice that required to produce $\frac{1}{2}$ in. Why did the fan produce only 40 per cent more air when running twice as fast as it did when originally put in the mine?

The pressure increased as might have been expected from the increased speed of the fan, but the quantity of air should have been 100,000 cu.ft. instead of only 70,000 cu.ft. Why was this? With the first condition of the mine, had the fan been speeded up to twice its original running speed, the quantity at that time would have been 100,000 cu.ft. per minute and the water gage would have been 2 in. I had abundant data to confirm this. After the lapse of a few years, however, it was a fact that the fan at twice its original speed was passing through the mine only 70,000 cu.ft.

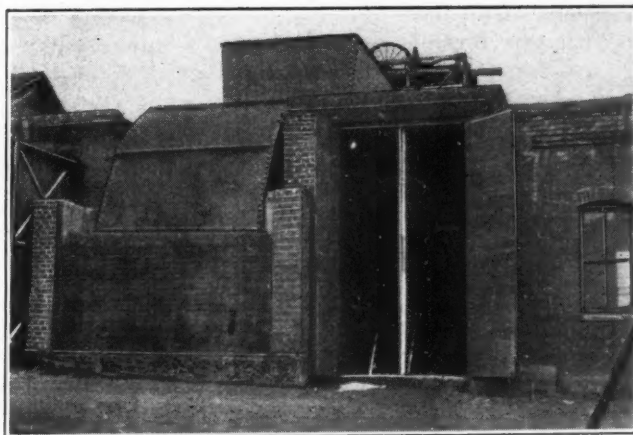


FIG. 1—FIRST FAN AT GRANT TOWN, W. VA.

This fan was 16 ft. in diameter and much too large for the mine. Its equivalent orifice was 120 sq.ft. As it required a 2.3-in. water gage to pass 132,000 cu.ft. of air per minute, the equivalent orifice of the mine was 35 sq.ft. The fan made more air than the mine would take, and the air had to work its way back through the fan, and in doing this tended to tear the fan to pieces.

*Paper read before Engineers' Society of Western Pennsylvania.

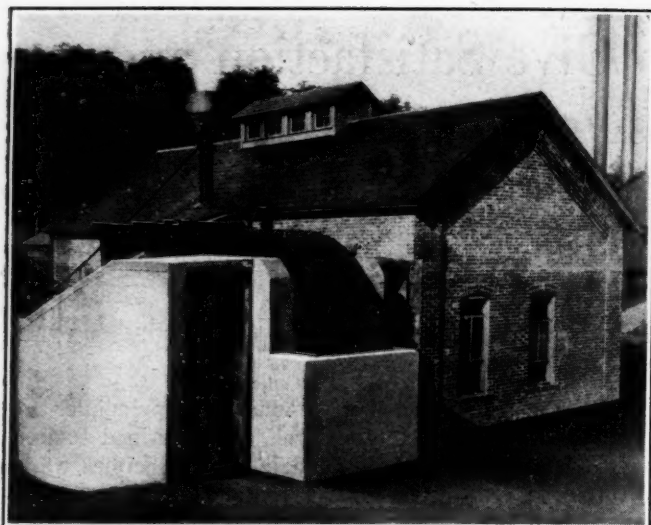


FIG. 2—SECOND FAN AT GRANT TOWN

Passing 300,000 cu.ft. of air per minute at a 9-in. water gage, this 8-ft. fan had an equivalent orifice of 40 sq.ft., which was about the same as that of the mine. Then an airshaft was sunk at the back of the workings. The company is installing another fan to take advantage of the fact that the equivalent orifice of the mine is now 58 sq.ft. instead of 40. Two-thirds of the power should be saved by using the larger fan.

But this air current required 2 in. of water gage to pass it, whereas when the fan was first installed this same 2 in. of pressure would pass 100,000 cu.ft. per minute. As a further evidence of something being wrong, much that could not be measured was backing out of the intake orifice of the fan. In my investigation I found that if I could in the second instance pass 100,000 cu.ft. per minute instead of 70,000 cu.ft. I would require for that 4 in. of water gage instead of 2 in., which showed a much worse condition of the mine than had been anticipated.

After investigating many such conditions I began to compare the orifice of passage of the mine with the orifice of passage of the fan. Most of you will recall in your study of mine ventilation that a mining engineer named Murgue had developed a formula for finding this orifice of passage and had expressed it by the

$$\text{equation Equivalent Orifice} = 0.0004 \times \frac{Q}{\sqrt{\text{water gage}}}$$

Q = the quantity of air passing in cubic feet per minute, the water gage being taken when the air is measured. The water gage is measured in inches and in fractions of an inch.

With this formula we can observe a mine as it de-

velops and determine its orifice of passage, and with such information we can readily determine why our ventilation is easy or difficult and why we get the quantity we set out to get, or why we do not get any such quantity.

Now, let us take the case just cited. We set out to get 50,000 cu.ft. at a water gage of 0.5 in. and later tried to pass 100,000 cu.ft. at 2-in. water gage. Using Murgue's formula, the equivalent orifice = $0.0004 \times \frac{50,000}{\sqrt{0.5}} = 28.1$ sq.ft. or again equivalent orifice = 0.0004

$\times \frac{100,000}{\sqrt{2}} = 28.1$ sq.ft. So, we must have the same

equivalent orifice to pass 100,000 cu.ft. per minute at a 2-in. water gage as to pass 50,000 cu.ft. per minute at a $\frac{1}{2}$ -in. water gage. But you will note that we found 70,000 cu.ft. per minute at a 2-in. water gage instead of 100,000 cu.ft. at that water gage, as we had anticipated. Let us apply Murgue's formula and see if we find the difficulty. The equivalent orifice = $0.0004 \times \frac{70,000}{\sqrt{2}} = 19.8$ sq.ft. instead of the 28 sq.ft. which

we assumed that we had for our equivalent orifice. Having found that an equivalent orifice of 28 sq.ft. is required we can readily see that we cannot put 100,000 cu.ft. per minute through an equivalent orifice of 19 sq.ft.

You will note that this equivalent orifice is the result of all the factors that impede the flow of air through the mine, whether it be rubbing surfaces, falls of roof, regulators or any other form of obstruction.

In the case above cited, when 70,000 cu.ft. is passing, the fan, if properly designed to meet the original condition, will back a portion of its air out of its intake orifice and will work at low efficiency, no matter who made it.

Now, we sometimes meet the opposite condition, which is where the equivalent orifice of the mine is increased above what was anticipated, in which case if the fan is properly designed for the work intended, it will not back a portion of the air from the intake orifice, but it will wiredraw the air through the fan—that is, the fan will be required to make more pressure to get the air through itself than is required to pass the air through the mine. So you see it is extremely important to the designing of the fan that the equivalent orifice of the mine be known, but after the fan is put into actual operation if the equivalent orifice of the mine

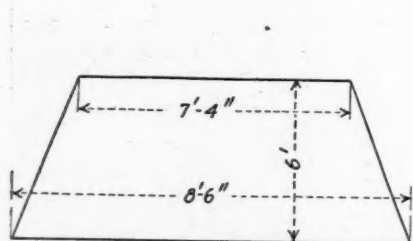


FIG. 3—SECTION OF AIRWAY AS NORMALLY DRIVEN

Area was 48.15 and equivalent orifice 20 sq.ft. as can be calculated when it is known that 116,000 cu.ft. of air per minute was passed at a 5.4 in. water gage.

The recording wattmeter showed in test, recorded in Fig. 4, 95 kw. or 127,345 hp. The over-all efficiency was 77.18 per cent. With 2,000 volts and 54 amperes of current and an assumed power factor of 80 per cent the horsepower used would be 160 and the over-all efficiency 61.5 per cent. In the case of the test recorded in Fig. 5, the voltage was 2,290 and the amperage 11. Again assuming an 80-per cent power factor the horsepower was 26.89 and the over-all efficiency 46.5 per cent.

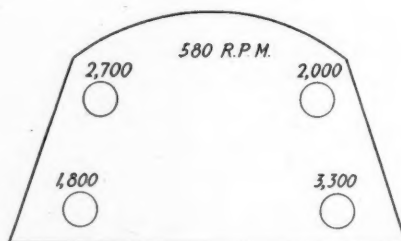


FIG. 4—VELOCITIES OF AIR WITH 580 R.P.M. OF FAN

Average velocity, 2,450 ft. per minute. Total current, 116,000 cu.ft. per minute. Water gage, 5.4 in. Power in the air, 98.4 hp.

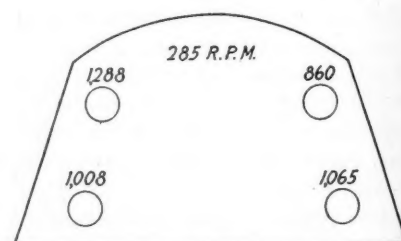


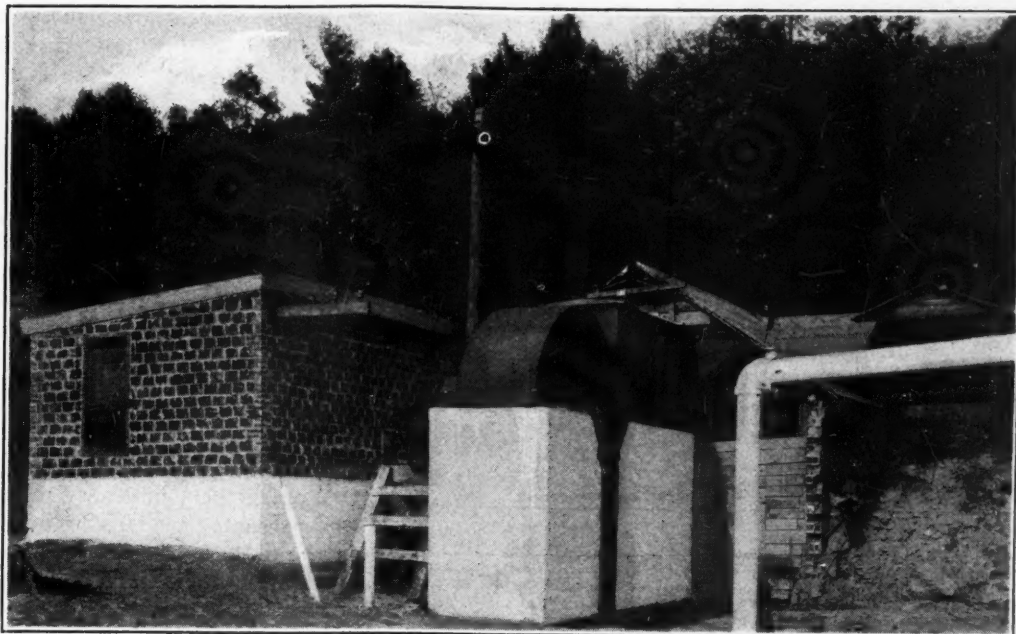
FIG. 5—VELOCITIES OF AIR WITH 285 R.P.M. OF FAN

Average velocity, 1,055 ft. per minute. Total current, 51,787 cu.ft. per minute. Water gage, 1.5 in. Power in the air, 12.54 hp.

FIG. 6

**Turbine Fan,
Cherry Tree
Coal Co.
Mine**

The fan is only 57 in. in diameter, but as its equivalent orifice is the same as that of the mine a high efficiency is attained. The matching of mine with fan is one of the most essential requirements in mine ventilation.



be changed to any great extent, the fan will not work with a high degree of efficiency no matter how it may be designed.

We frequently hear the mine manager say he must have a certain make of fan; that he has no time for any other make. Now, that opinion is based, I have found, on the manager having had a fan of his favorite make at a mine, the equivalent orifice of which is about the same as that of the mine, whereas the other make is at a mine where the equivalent orifices of the fan and the mine do not thus match.

Ten or twelve years ago I was called upon to investigate a mine at Grant Town, W. Va. This mine is in a gaseous district and requires a large quantity of air. A 16-ft. Capell fan was in operation. It was passing 132,000 cu.ft. of air per minute at 2.3-in. water gage and was at the limit of its capacity and rapidly going to pieces. You will note that the equivalent orifice of this mine was small. The equivalent orifice = $0.0004 \times \frac{132,000}{\sqrt{2.3}} = 35$ sq.ft. The equivalent orifice of the fan was about 120 sq.ft. The fan was much too large for the mine.

The management decided they wanted 300,000 cu.ft. of air, and that they would keep the water gage down to 9 in., which meant an equivalent orifice equal to $0.0004 \times \frac{300,000}{\sqrt{9}} = 40$ sq.ft. A fan was placed

at this mine with that equivalent orifice of 40 sq.ft., and for a few years the orifice of the mine and the orifice of the fan remained about the same. During this period the fan worked with the greatest efficiency. About two years ago an airshaft was sunk at the back of the mine in order to short-circuit the air. By the use of this shaft the mine is now passing 250,000 cu.ft. of air per minute at a 3-in. water gage. Now let us examine this mine with Murgue's formula:

$$\text{Equivalent orifice} = 0.0004 \times \frac{250,000}{\sqrt{3}} = 58 \text{ sq.ft.}$$

The mine has now 58 sq.ft. of equivalent orifice, and the fan in use has but 40 sq.ft. To pass 250,000 cu.ft. of air through itself the fan must create a much higher pressure than is required to pass the air through the

mine. Consequently it is now a wasteful machine, although it was economical and efficient before the shaft was sunk, and the equivalent orifice of the mine enlarged beyond the equivalent orifice of the fan.

A new fan is being placed at the mine to have an equivalent orifice the same as that of the mine, and as long as such conditions are obtained this fan will have the greatest efficiency. Let us see now what difference there would be in the power applied to operate each fan. It will be remembered that to pass air through two different sized openings requires power inversely as the cube of the size of the openings. The former fan had a 40-sq.ft. orifice of passage and the new fan has a 58-sq.ft. orifice of passage. The cube of 40 is 64,000. The cube of 58 is 195,112. It would require three times as much power to pass the 250,000 cu.ft. per minute through the fan with the 40-cu.ft. equivalent orifice as to pass the same quantity through the fan with that orifice increased to 58 sq.ft. when the mine resistance is equal to 3 in. of water gage.

The Cherry Tree Coal Co. has a mine at Emeigh, Pa., through which the fan at present installed is passing 116,000 cu.ft. of air per minute at a 5.4-in. water gage. The equivalent orifice of this mine is $0.0004 \times \frac{116,000}{\sqrt{5.4}} = 19.97$ sq.ft.—nearly 20 sq.ft. This is not

a big orifice to pass over 100,000 cu.ft. of air, but you will note the test taken by the engineers of the Cherry Tree Coal Co. in Fig. 3 and that the over-all mechanical efficiency is 77 per cent.

This efficiency is high because the fan is designed for a mine such as this with a small equivalent orifice and because the equivalent orifices of the mine and the fan are practically the same. An airshaft has since been sunk near the back of the mine, and the coal company is now installing at this new airshaft a new fan which has an equivalent orifice which will suit the new equivalent orifice of the mine. The continued use of the present highly efficient fan on this mine, with its enlarged equivalent orifice, would be extremely wasteful of power.

I will now call your attention to a mine whose fluctuating equivalent orifice requires the changing of its fan from a large to a small fan and back again to the large



FIG. 7—SIX-FOOT FAN OF LOWBER GAS COAL CO.

Too big a fan caused a continuous waste of electric current. By replacing a fan with an equivalent orifice of 45 sq.ft. with one of about 32 sq.ft. enough power was saved to pay for the fan in eight months. It should be added that the first fan matched the mine satisfactorily when it was first installed.

fan. The Lowber Gas Coal Co. has a mine near Fayette City, Pa., which has these conditions. The mine was developed in such a manner as to pass 100,000 cu.ft. per minute at 2-in. water gage. The equivalent orifice is

$$\text{therefore } 0.0004 \times \frac{150,000}{\sqrt{2}} = 42 \text{ sq.ft.}$$

An 8-ft. modern steel fan was placed at this mine. Its equivalent orifice was about 45 sq.ft. It was close to the requirements of the mine when first installed, but as the mine developed the quantity of air given off by this fan was gradually decreased until when I first observed it it was passing through the mine 87,000 cu.ft. per minute at 1.2-in. water gage. Now let us observe this new condition with the use of Murgue's formula.

$$\text{The equivalent orifice} = 0.0004 \times \frac{87,000}{\sqrt{1.2}} = 31.63$$

sq.ft. instead of the original 42 sq.ft. the equivalent orifice has dropped 10 sq.ft. to less than 32 sq.ft.

Now the power required to pass the air with the 8-ft. fan originally at the mine was 78 hp. measured on the brushes of the direct-current motor by which the fan is driven. A load such as this should demand about 30 hp. with a suitable fan. Such a fan was installed with an equivalent orifice of about 30 sq.ft. and the saving in power was nearly 50 hp. The cost of making the new installation—fan, motor and belt—was approximately \$4,000 and this sum is the reduction in the power bill saved in about eight months.

The 8-ft. fan originally installed, though left idle, was not dismantled but left still connected to the mine, so that it could be used should a new airshaft be sunk at the back of the mine. This it is expected would enlarge the equivalent orifice of the mine to about 45 sq.ft. The new shaft probably will be connected to the mine within four years from the time when the temporary fan was installed. You will note that in this brief period the temporary installation will have paid for itself at least six times out of the power saved.

The equivalent orifice of the mine, therefore, is the basis on which the calculations for a mine fan should be made. Having the equivalent orifice and the quantity and pressure known, we can determine accurately the characteristics of the fan. Knowing the pressure or

water gage, we know the speed at which the air must travel and accordingly the equivalent air pressure. With the speed of the air known, we know what must be the velocity of the rim of the fan wheel in order to create the given air pressure, and knowing the speed of the fan and its volumetric capacity, we can determine the width the wheel should be to give off the quantity of air required at the given pressure.

This may seem like a complicated cycle of calculations, but it is all logical and each step follows in succession from the base of all the calculations, which is the orifice of passage of the mine.

Vegetable Origin of Anthracite Beds At Last Definitely Proved

AT THE meeting of the Society of Economic Geologists held in New York May 18 and 19, a paper was presented by H. G. Turner, of Lehigh University, on the "Microstructure of Anthracite Coal," which was illustrated by lantern slides made from microphotographs of great beauty, showing plainly and clearly many different types of vegetable structure.

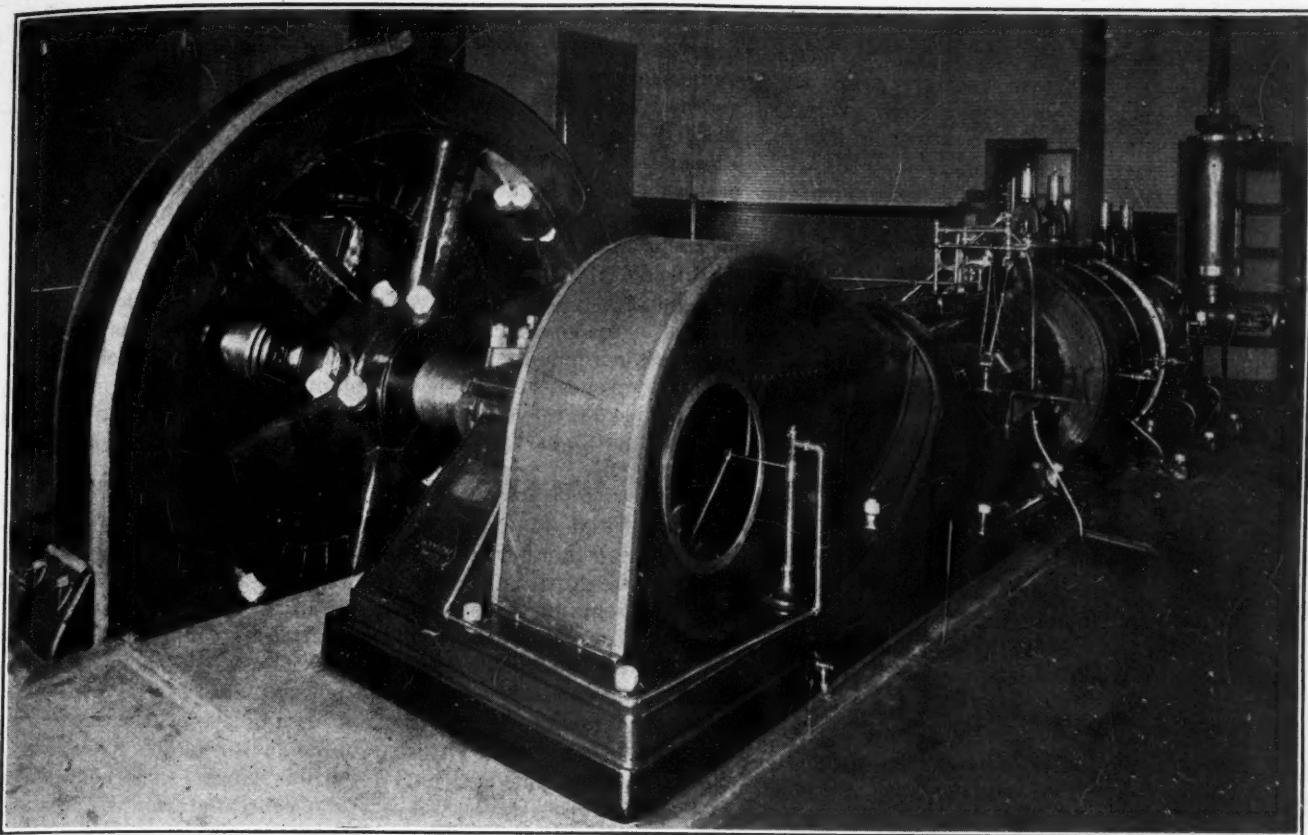
This adds final and conclusive proof to the heretofore generally accepted belief that anthracite is, like bituminous coal, of vegetable origin. Prior to this work no microscopic slides had ever been produced actually showing the presence of such material, it having been found impossible to produce sections thin enough to be transparent, and efforts to learn the structure by examination of polished surfaces had entirely failed.

Most of the work described has been done within the last year. Many have tried unsuccessfully to prove or disprove the presence of such structures in anthracite and it is rather remarkable that at last this has been accomplished. The slides are far better than those which have been produced showing the presence of similar vegetable structure in bituminous coal.

The method used by Messrs. Turner and Randall in producing these slides is remarkably simple and easy of application, only about twenty minutes' work being required to prepare a specimen for the microscope or for making photomicroscopic slides.

The method as described by Mr. Turner is as follows: From a good specimen of anthracite a cube with about 1 in. sides is sawed. One side of this cube is ground and polished on a rubbing bed or table, using progressively finer and softer polishing powders, as is the practice in preparing highly polished specimens. This produces a fine mirrorlike surface. The specimen is then put in a furnace and heated to a temperature of about 250 to 300 deg. C. It then is taken from the furnace with a tongs, and the polished face of the cube is held in the flame of a bunsen burner until the surface (but not the body of the cube) is heated to a red heat. The flame is then removed, and the specimen when cooled is ready for microscopic examination by reflected light. The heating to a red heat causes a differential etching of the surface by oxidation, so that the structure is thrown into bold relief.

Messrs. Turner and Randall have in this way worked up a large number of specimens of coal from different coal seams in the southern and middle western Pennsylvania anthracite districts, this work indicating that certain types of vegetable structure apparently predominate in some of the coal beds, thus indicating the possible use of this method for correlating coal seams in different districts.



The Isolated Power Plant in the Coal Industry

Continuity of Service Essential to Economy and Safety—Isolated Power Plant Can Utilize Small Sizes of Fuel at Mines—Transmission of Electrical Energy Cheaper Than Freight Rates on Fuel

BY S. J. H. WHITE
Erie City Iron Works

MODERN methods and requirements in coal mining frequently demand the installation of isolated power-generating units. Power supplied from outside sources should never be depended upon as the sole source of supply where continuity of service is imperative. Outside sources of supply are subject to probable interruptions due to line troubles resulting from wind, sleet, thunder storms, fires, breakage of lines, failure of insulators, etc., as well as possible accidents to central-station apparatus, transformers, switching and control equipment.

The safety and often the life of the coal miner is dependent to a large degree upon continuous operation of the power plant; therefore the danger of interruption of power should be reduced to an absolute minimum. The cost of mining coal has increased to such an extent that even coal mines have found it advisable to install power-generating equipment with a view to obtaining an outlet for their small sizes of fuel and effecting increased economies in operation.

The greatest care should be exercised in selecting power-generating units, auxiliaries and all minor equipment entering into any part of the power plant. The peculiar conditions and requirements of this class of

service call for dependability of every detail and especially is this true of the prime movers.

As the prime mover in the power plant is one of the most important pieces of equipment it should be of a design and type to eliminate as far as possible any probability of failure. It should be of ample capacity to carry the high-peak and emergency demands which frequently occur. It should have unusually close speed regulation, and the speed should not be materially affected by wide variations in steam pressure or load; finally, it should be direct-connected to the generator, thus eliminating belts, ropes, gears, etc.

CONTROL EQUIPMENT SHOULD BE OF SIMPLE DESIGN

In the event that ample water supply is available the prime mover may be operated condensing, but in such cases provision should be made to enable the engine to continue operating without the slightest danger of an accident in the event that the vacuum fail from any cause. Auxiliaries should be steam-driven to insure greatest dependability. Switchboards and all control equipment should be designed as simply as possible consistent with necessary flexibility, safety and up-to-date practice.

In the event that central-station power service is within available distance it is advisable that the in-

NOTE—Headpiece shows a typical isolated power plant at a coal mine.

dependent plant be tied in with it or that emergency-service connection be provided. Either plan insures a duplicate source of supply readily available for extra heavy peak loads or emergency requirements.

Where direct current is required in the mine, as is usually the case where haulage locomotives are used, and alternating current is supplied by the central station, a motor generator or synchronous converter will be required to connect the two systems.

To meet such conditions of load and dependability requires an engine that is extremely simple and designed for reliability, economy and durability. Its speed regulation should be easily adjustable to operate successfully under any steam or exhaust conditions and run either non-condensing or condensing without troublesome adjustment. Ample allowances should be made for handling severe overloads.

The valves should be of a type that will remain steam-tight indefinitely. The oiling system preferably should be automatic, thus insuring perfect lubrication and eliminating all probability of interrupted service due to hot boxes. Steam economy also is an important prerequisite together with ability to operate continuously at high efficiencies for long periods.

PULVERIZED COAL FED TO FURNACE AUTOMATICALLY

There is always a large amount of slack and unsalable coal produced in the screening process at the mines which in the past has been thrown away as waste. Such discarded products usually contain the original number of B.t.u. per pound, but until recently this fuel could not be successfully utilized in producing steam. To meet these conditions the Erie City Iron Works has placed on the market a successful combination bituminous-coal pulverizer and feeder, which thoroughly pulverizes the coal and at the same time automatically feeds it to the boiler furnace with just the correct volume of air to obtain highest efficiency. These machines permit the utilization of the waste fuel mentioned above, and the method of automatic firing employed effects extremely high furnace efficiencies, usually much higher than is obtained with high-grade coals and the best mechanical stokers.

The coal-pulverizing apparatus referred to has been perfected and thoroughly tested out in several power plants during the past three or four years. This method of firing what were formerly considered waste coal products has reduced fuel cost in power plants many per cent, not only because of reduced cost of the lower grades of fuel consumed but also because of the much higher furnace efficiencies obtained. Full automatic control of coal and air supply, as well as damper control, in conjunction with the coal-pulverizing apparatus makes the boiler plant equipped with such devices the most efficient ever developed.

It is entirely practicable for the coal mines to install large power plants equipped to burn the waste coal as outlined and sell the surplus energy generated to the numerous large central stations and systems, who will gladly purchase same at rates attractive enough to prove profitable to the mine owners, and at the same time result in benefit to the systems.

The high freight rates on coal are causing central stations to boost their rates; therefore if the plan suggested is carried out it will prove of great benefit to the coal-mine owners, the central stations and the general public.

A much safer and more profitable plan is for the

various coal mines to install power-generating plants as suggested, operate them on waste coal products, and operate their plants in parallel with each other and the large central-station transmission lines, thereby forming an immense "super-power plant" consisting of many small units. The failure of several of these units, even at the same hour, would inconvenience no one seriously, not even the workers at the mines where the local power plant may be in trouble.

Obtaining such power from the coal mines would be less costly to central stations than to produce it with a super-power plant, provided the latter has duplicate equipment, as it should have. The fixed charges on proposed super-power plants would be enormous, and as an inevitable consequence the cost of operation would be high.

MINE PLANTS COULD GET POWER WITHOUT COST

The plan herein suggested constitutes a dual generating plant with smallest investment, and the investment, being divided among many, is a minimum burden as such. Our coal mines are fortunately situated near industrial centers, and the cost of transmission lines would be comparatively small, as they would be used merely to connect the proposed power plants at the mines with the existing high-tension lines of the central stations.

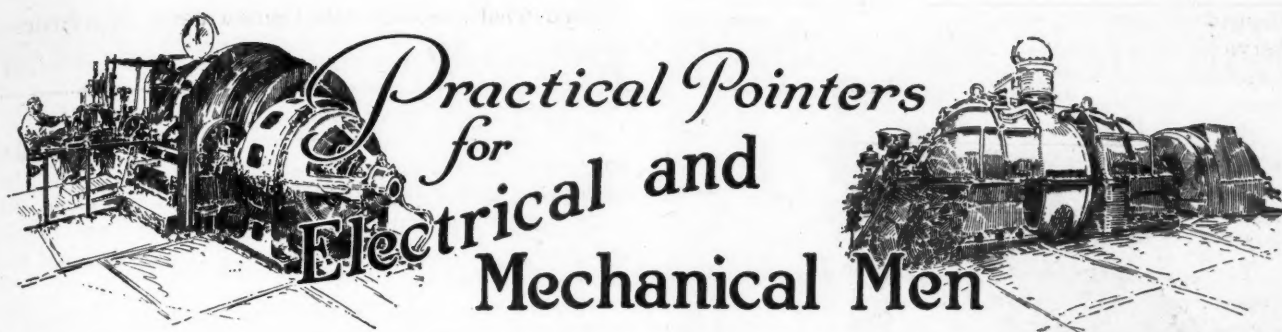
Most of the present mine power plants are more or less inefficient, but if surplus power were sold twelve months in the year to the central-station interests at slightly above cost, it would result in the coal mines getting their power for nothing, and justify much better plants being installed.

Coal-mine owners should endeavor to assist in solving our power problems by taking a deeper interest in the power-plant industry, because they actually hold the key to the situation in that they own and control the greatest source of power supply. Coal is the inactive latent state of energy which is merely put through the power house to be converted into electrical energy. Then, again, it is far cheaper freight to ship electrical energy than latent coal-energy which at its point of destination is converted into some form of useful energy like electricity.

Would Educate Workers in Economics and Government and Human Relations

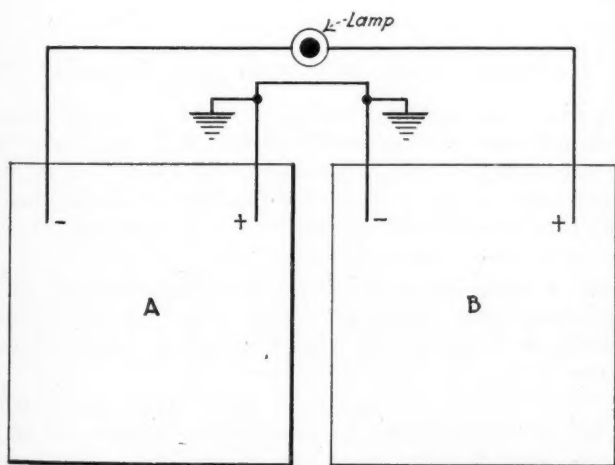
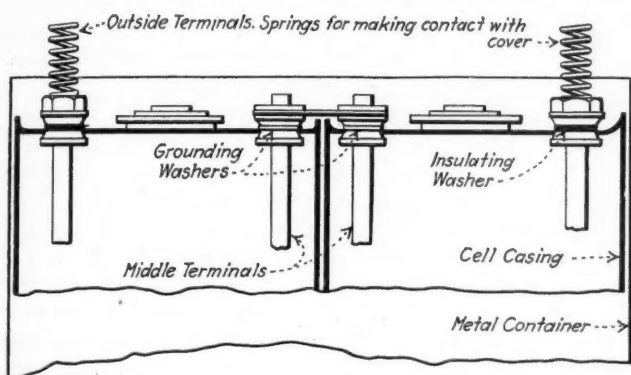
THE committee on industrial relations of the National Association of Manufacturers, which is headed by M. M. Davidson, recommends that the association take steps to develop a plan of constructive education for managers and workers in industry in the fundamental principles of economics, of government and of human relations. It is the opinion of the committee that much of the discontent and distrust among the workers has come through a misunderstanding of or lack of knowledge of the economic principles involved and through failure to fully recognize and emphasize the economic principles involved, rather than through any fundamental flaw in the system itself.

The report also emphasizes the need of some agency to place before the workers information that will enable them to think straight and act accordingly. The association and the manufacturers are warned that if they ignore the slow-working poison of vicious propaganda among the workers they may soon find it too late for either preventive medicine or surgery.



Repair to an Edison Mine Lamp Battery Which Can Be Made at the Mines

THERE is an interesting "kink" in regard to the Edison storage-battery miners' lamp which is not, I believe, generally known by a good many men who are in charge of the maintenance and care of these lamps. As everyone who has anything to do with these lamps knows, the battery for each lamp is made of two cells set edge to edge inside of a metal container. Each cell has two terminals and in the assembled battery the two outside terminals have a spring attached to them for the purpose of making the contact with the battery cover to which is attached the cord extending to the lamp and also to hold the cells firmly in the container. These same two terminals also are insulated from the metal casing of the cells as shown in Fig. 1. The two middle terminals are grounded to the metal casing of the cells and are connected to each other so that the two



FIGS. 1 AND 2—CIRCUIT DIAGRAM OF EDISON LAMP

Changing the relative positions of cells A and B makes the outer terminals the inner terminals, which are normally grounded and tied together by a connecting strip. An internal ground on a middle terminal is therefore of no consequence to the operation of the battery.

cells are in series. This really means that the positive terminal of one cell and the negative terminal of the other cell are grounded to their metal cell casings. (See Fig. 2.)

If for some reason the outside terminal of either one of the cells becomes grounded inside the cell that cell becomes short-circuited and of course will not operate and the battery as a whole will not function. This can be remedied by taking the cells out of the container and reversing their position—that is (referring to Fig. 2), cell A can be placed in position B and cell B in position A—and by removing the grounding washers from what are now the two outside terminals and placing them on the two inside terminals and also by removing the two insulating washers from what are now the two inside terminals and placing on the outside terminals. When this is done the internal ground will be on one of the two middle terminals which are normally grounded anyhow and thus will not affect the proper operation of the cell.

By this change it is readily possible to place back in service any cell that has become grounded internally on one of its terminals. In many cases this will eliminate the expense and delay occasioned by sending the battery back to the factory to be repaired.

The cells of these batteries should not be opened at the mines because this destroys the container and thus makes it impossible to reseal it properly.

Wilkes-Barre, Pa.

O. E. KENWORTHY.

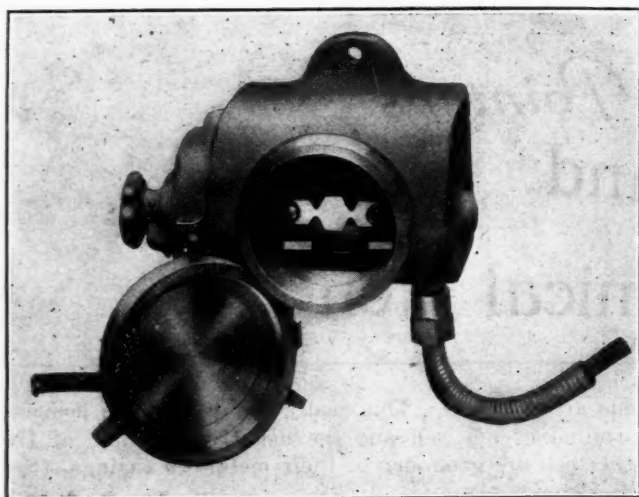
Flameproof Fuse Box

AN IDEA of what may be expected to be found on the permissible flashproof storage-battery locomotive can be gained from some of the latest developments in accessories and parts which have recently been brought out.



EXPLODED VIEW OF FUSE BOX

Fuse links are mounted on the cylindrical drum, which is inserted into the end of the fuse compartment. Three such fuse links amply protect the equipment and eliminate the necessity of refusing on the road, which would defeat the purpose of the scheme.



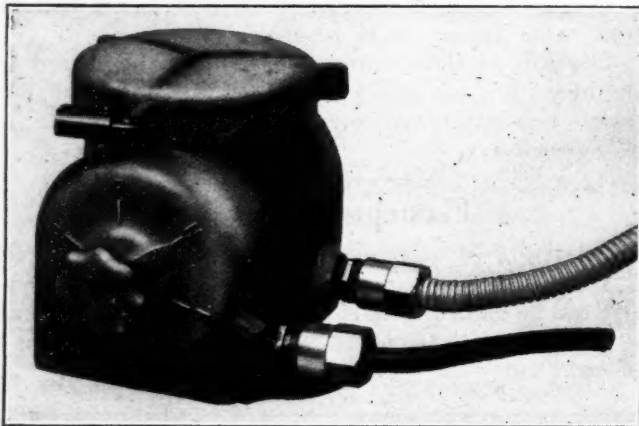
FUSES AND DRUM IN POSITION

With the fuse cylinder in position the inspection cap may be removed and all fuse links turned into sight. This of course can not be done except by the properly authorized person who does so in a non-gaseous location in the mine.

The schedule governing the design of the locomotive and its parts prohibits the opening of permissible compartments during operation; the blowing of a fuse therefore would necessitate the towing of the locomotive to the barn unless other arrangements were made.

To meet this objection the Mancha Storage-Battery Locomotive Co. has designed a permissible compartment in which three standard renewable fuse links are mounted on a drum. This drum can be operated by means of a handwheel indexed on the outside so as to show whether fused or neutral.

A compartment of this type is located at each end of the locomotive and connected into each battery lead so as to furnish complete protection against grounds



ASSEMBLED FLAMEPROOF FUSE BOX

The wires leading to the box are amply protected by a metallic covering. At the entrance to the box stuffing glands are provided. Change from one fuse to the other can be readily made by rotating the drum. A padlock securely locks all parts.

or short-circuits. Except under abnormal conditions it should never be necessary to go to the motor barn during a shift. The leads enter through stuffing boxes, and a lock also is provided to make the apparatus secure against tampering.

NEW COAL SAMPLING RECORD.—In a recent month the Pittsburgh experiment station of the U. S. Bureau of Mines established a new record for the analyzing of coal samples, 1,030 samples having been examined and reported upon. These samples were collected from the different fields of the country, including Alaska.

Care of Bearings on Generating Machines

FOR generating equipment fitted with self-oiling bearings, the following rules should be followed to insure continuity of service:

The well should be filled to such a height that the rings will carry sufficient oil upon the shaft. If the bearings are too full, oil will be thrown out along the shaft. The oil should be renewed about once in six months, or oftener if it becomes dirty and causes the bearings to heat.

The bearings must be kept clean and free from grit. They should be frequently examined to see that the oil supply is properly maintained and that the oil rings do not stick. Use only the best quality of oil. New oil should be run through a strainer if it appears to contain any foreign substance. If the oil is used a second time, it should first be filtered and, if warm, allowed to cool.

A warm bearing or a "hot box" probably is due to one of the following causes:

- (1) Excessive belt tension.
- (2) Failure of the oil rings to revolve with the shaft.
- (3) Rough bearing surface.
- (4) Improper fitting of the journal boxes.
- (5) Bent shaft.
- (6) Use of poor grade or dirty oil.
- (7) Bolts in the bearing cap may be too tight.
- (8) End thrust, due to improper leveling. A bearing may become warm because of excessive pressure exerted by the shoulder of the shaft against the side of the bearing.
- (9) End thrust, due to magnetic pull, rotating part being "sucked" into the field because it extends beyond the field poles further at one end than at the other.
- (10) Excessive side pull, because the rotating part is out of center.

If a bearing becomes hot, first feed heavy lubricant copiously, loosening the nuts on the bearing cap; and then, if a machine is belt-connected, slacken the belt. If relief is not afforded, shut down, keeping the machine running slowly until the shaft is cool, in order that the bearing may not "freeze." Renew the oil supply before starting again. A new machine should always be run at a slow speed for an hour or so in order to see that it operates properly. The bearings should be carefully watched to see that the oil rings are revolving and carry a plentiful supply of oil to the shaft.

Relation Between Phase and Capacity

WILL you be kind enough to explain through your columns the relation between phase and capacity of alternating-current equipment? By this I mean an explanation of the volt-ampere capacity of single-, two- and three-phase connections. **ELECTRICIAN.**

For a single-phase generator or transformer the output at any time, expressed in kva., is the product of the current in amperes and the pressure in volts divided by one thousand.

For a two-phase generator or transformer the output at any time, expressed in kva., is the sum of the two single-phase outputs as above. If the load is balanced the two-phase output is twice the output of either phase. For a three-phase generator or transformer with balanced load, the kva. output is the product of the line current, line voltage and 1.73 divided by one thousand.]

Iron Sulphide in Coke Can Be Reduced by Air and Heat Also Free Sulphur, but Not in Sufficient Quantity*

Experiments Show That Ferrous Sulphide in Some Cokes Can Be Decreased 81 per Cent and Free Sulphur 22 per Cent—Solid-Solution Sulphur Unchanged—Sulphate Sulphur Increased—Roasting and Vacuum Fails

BY ALFRED R. POWELL

Associate Chemist, U. S. Bureau of Mines, Pittsburgh, Pa.

IN A paper† entitled "The Forms of Sulphur in Coal," contributed to the *Journal of the American Chemical Society*, I have described an investigation in which the forms of sulphur in coke were determined and described. Coke was found to contain four characteristic forms of sulphur—namely, ferrous sulphide, sulphates, adsorbed free sulphur and sulphur held in solid solution in the carbon.

While the coke is still in the oven only two forms of sulphur are present—namely, the first and the last of those mentioned. During the quenching, however, the sulphur of the coke is subjected to much oxidation, a portion of the ferrous sulphide being oxidized to free sulphur and sulphates, the sulphur in solid solution remaining unchanged. The coke, however, loses no sulphur during this process, as the free sulphur which is formed is retained by the coke in an adsorbed form.

OXIDIZE SULPHIDE AND SO GET RID OF SULPHUR

As this ferrous sulphide is so easily oxidized, an investigation was undertaken to determine whether industrial advantage could be taken of this property for the desulphurization of coke. Although it is true that such a roasting process would not reduce the sulphur which is in solid solution, still the removal of the sulphur that is in the form of ferrous sulphide would undoubtedly improve the coke from the standpoint of the metallurgist. The betterment in the coke would arise not only from the decrease in total sulphur, but also from the large decrease in the ferrous sulphide, which is responsible for the contamination of the iron in the upper part of the blast furnace.

The desulphurization of coke by roasting in air is not a new idea, but dates back to the earliest days of coke manufacture. In 1871, Philippart‡ published the results of some work done by him on the desulphurization of coke by air, as well as a review of the results of earlier investigators. In these earlier experiments, nothing was known of the forms in which the sulphur existed in the coke, and the temperature measurements were only approximate, in consequence the results were neither conclusive nor complete. The desulphurization figures given by these early investigators generally showed a low efficiency for the process, but some extraordinary results were claimed by certain inventors.* In the light of our new knowledge concerning the sulphur in coke, it seemed to be important enough to warrant investigation.

One of the first factors to be determined in this investigation was the best temperature for the oxidation

of the ferrous sulphide in the coke. It might be assumed that the higher the temperature the faster would be the oxidation of the ferrous sulphide but it must be remembered that the coke itself would oxidize more rapidly at high temperature. It was, therefore, necessary to determine a mean temperature, that would best satisfy both conditions.

WHEN OVER HOT COKE TAKES SULPHIDE'S OXYGEN

A series of tests at different temperatures was made, the powdered metallurgical coke being placed in a tube heated to the desired temperature, a slow current of air being passed over it. An analysis of the residue for ferrous sulphide determined the thoroughness of the oxidation, and the loss in weight of the sample showed the relative coke loss at different temperatures.

At 300 deg. C., the oxidation of ferrous sulphide proceeded rather slowly, and there was no loss of coke. At 400 deg. C., the oxidation took place much more quickly, and still there was no appreciable loss of coke. At 500 deg. C., the oxidation of the ferrous sulphide was complete at the end of a few minutes, and the coke loss was small, being under 1 per cent. At 600 deg. and higher a noticeable coke loss took place and the oxidation of the ferrous sulphide was slower, if anything, than at 500 deg. as the oxygen that should have combined with the sulphide was consumed in the combustion of the coke.

These experiments showed that 500 deg. was the best temperature for the oxidation of the ferrous sulphide, when the relative speeds of oxidation of the ferrous sulphide and the coke itself were considered. For this reason the temperature used in the treatment of the chunk coke was 500 deg., although several runs were made at temperatures as high as 650 deg., for reasons that will be described later.

DIFFERENTIATING THE FOUR SULPHURS IN COKE

The method of analysis used to ascertain the percentage of the various forms of sulphur in the coke both before and after the desulphurization treatment I have described in another paper.* In brief this examination consisted in treating one sample of the coke with hydrochloric acid, the hydrogen sulphide evolved being a measure of the ferrous sulphide in the coke. The sulphate in the coke would be in this hydrochloric-acid solution, and could be determined as such. Then, another sample of the coke was reduced by heating it to a red heat in an atmosphere of hydrogen, and cooling it in the same atmosphere. This reduced the sulphates to sulphides, and also the adsorbed sulphur to ferrous sulphide.

*Article entitled "The Desulphurization of Coke by Air," in Reports of Investigations, U. S. Bureau of Mines.

†Vol. 45, 1923, pp. 1-15.

‡Philippart, M. A., *Revue Universelle des Mines*, vol. 28, 1871, pp. 261-318.

*Powell, Alfred R., "The Quantitative Determination of the Sulphur Forms in Coke." To be read before the Gas and Fuel Section of American Chemical Society, New Haven, 1923.

On treating this with hydrochloric acid, the hydrogen sulphide evolved would be a measure of the combined ferrous sulphide, sulphates and the adsorbed free sulphur. By subtracting the ferrous sulphide and the sulphates, which were already known, the content of free adsorbed sulphur could be calculated. Then the combined ferrous sulphide, sulphates, and free sulphur subtracted from the total sulphur gave the sulphur held in solid solution by the carbon. In this manner all four of the sulphur forms could be determined. The method is quite reliable, as has been proved by checking its results against others which have been developed in the course of investigations into the sulphur in coke. The comparisons have been very satisfactory.

FREED CHEMICALLY, REMAINS PHYSICALLY BOUND

Any process designed to secure the desulphurization of coke by air must involve at least two stages. The first stage consists of the oxidation of the ferrous sulphide of the coke to form iron oxide and free sulphur. The best temperature for this reaction has already been mentioned. The pressure of the air is important, because increased pressure tends to force the air into the pores of the coke, and therefore, promote the oxidation.

The second stage of the process consists in the removal of the free sulphur which is formed in the oxidation, and has been adsorbed on the surfaces of the coke. Three different methods for the removal of this sulphur were tried in this investigation. The first consisted in the production of a vacuum, whereby it was hoped that the sulphur would volatilize at the temperature of the coke at that point in the process—that is, 500 deg. The second method tried for the removal of the sulphur was the use of a higher temperature than 500 deg.

However, whatever temperature was used in this second stage of the process had to be used in the first stage also, as it would be impracticable to permit the coke to cool down from the oven temperature to 500 deg., and then to heat it again for the second stage of the process. For this reason, 650 deg. was about the highest point that the temperature could be raised. The third method for the removal of the free sulphur from the coke consisted simply in the continued passage of the air through the coke after the primary oxidation of the ferrous sulphide, so as to roast out the retained sulphur. This latter reaction always took place to some extent as the oxidation of the free adsorbed sulphur started before the primary oxidation of the ferrous sulphide was complete.

HYDROGEN WILL NOT SERVE WITH IRON PRESENT

As the previous investigation of the coke sulphur had indicated that adsorbed sulphur readily could be removed from the coke by the action of hydrogen at a red heat, it might be assumed that such treatment might be efficiently applied after the oxidation of the ferrous sulphide, in order to remove the adsorbed free sulphur. However, in the instance mentioned, the iron had been removed from the coke by acid extraction before the hydrogen treatment. Where the iron remained in the coke, as it would in practice, the effect of hydrogen is simply to reverse the effects of the roasting and reconvert the free sulphur into ferrous sulphide. Such treatment is therefore out of the question.

As metallurgical coke must be kept in the chunk form, in which it is made, all of the desulphurization tests were performed on coke which ranged from 2 to 3 in. in diameter. By doing this, results could be obtained

which would be comparable to large-scale practice, whereas, tests on powdered coke would have little real meaning.

The apparatus for performing the tests consisted of a 3-in. steel tube about 2 ft. long, which was wound with resistance heating wire. A thermocouple was inserted between the tube and the winding so that the temperature of the tube could be controlled. A frame held the tube in a vertical position. The lower end was closed by a cap through which a small pipe was inserted for the air inlet.

The upper end was closed by a blind flange, which could be easily removed for the insertion and the extraction of the coke. An outlet through this end of the tube conducted the air through a solution of sodium hydroxide and thence to a vacuum-pump. Valves were provided so that the coke could be kept under air pressure, under vacuum, or simply in a steady stream of air at any rate of flow desired. The purpose of the sodium hydroxide solution was the absorption of the sulphur dioxide produced by the roasting.

USE OF CHUNKS OF COKE MARS EXPERIMENTS

One rather serious source of error was present in these experiments, and to eliminate it entirely seemed impossible. This was the fact that one chunk of coke had to be taken as representative of the original coke, while several other chunks from the same batch were taken for the test. In other words, it was impossible to crush the coke to get a homogeneous sample, as the tests had to be run on the coke of chunk size. However, from the analysis of different chunks from the same batch it was shown that the principal non-homogeneity existed in the solid-solution form of sulphur. As this form remains unchanged in the coke under treatment short of its actual destruction, the quantity after test was considered to be the same as that in the original sample, and the total sulphur was corrected accordingly. In this manner results were obtained which were comparable.

Two different cokes were tested in this investigation. No. 1 was a high-sulphur coke manufactured in a vertical retort. In this coke the solid-solution form of sulphur predominated, so that little desulphurization was possible. No. 2 was a coke made from Illinois coal and was of such a type that proper desulphurization could have made it available for blast-furnace coke. The results of the different tests are given in Table I.

TABLE I—DESULPHURIZATION BY AIR OF COKE NO. 1

	Original	Run 1	Run 2	Run 5
Temperature, deg. C.....	.....	500	650	500
Roasting time, min.....	.....	30	30	210
Vacuum time, min.....	.....	10	10	none
Sulphur evolved as SO ₂ , per cent of coke.....	.....	0.19	0.23	0.46
Coke loss, per cent.....	.....	none	1	1
Sulphur as solid solution, per cent.....	1.90	1.90	1.90	1.90
Sulphur as ferrous sulphide, per cent.....	0.58	0.24	0.24	0.11
Sulphur as free sulphur, per cent.....	0.62	0.50	0.58	0.39
Sulphur as sulphate, per cent.....	0.10	0.13	0.10	0.31
Total sulphur, per cent.....	3.20	2.77	2.62	2.71

DESULPHURIZATION BY AIR OF COKE NO. 2

	Original	Run 9	Run 10	Run 11
Temperature, deg. C.....	.....	500	500	500
Roasting time, minutes.....	.....	30	.....	.....
Vacuum time, minutes.....	.....	10	(a)	(b)
Sulphur evolved as SO ₂ , per cent of coke.....	.....	0.08	0.08	0.14
Coke loss, per cent.....	.....	none	none	none
Sulphur as solid solution, per cent.....	0.84	0.84	0.84	0.84
Sulphur as ferrous sulphide, per cent.....	0.26	0.16	0.12	0.10
Sulphur as free sulphur, per cent.....	0.19	0.23	0.18	0.15
Sulphur as sulphate, per cent.....	0.02	0.04	0.06	0.06
Total sulphur, per cent.....	1.31	1.27	1.20	1.15

(a) Alternate roasting and vacuum every few minutes for 20 times.

(b) Alternate roasting at 4-lb. air pressure and vacuum every few minutes for 20 times.

In the runs where the vacuum treatment was used, it was not possible to reduce the pressure to below 4 cm.

of mercury. This was due to the fact that the apparatus was of metal and was comparatively large. In consequence leaks could not be avoided. Also the vapor pressure of the sodium-hydroxide solution which was in the system, was a limiting factor on the completeness of the vacuum obtainable.

Run No. 1 shows the effect of roasting and vacuum on the sulphur of the coke. Over half of the ferrous sulphide was oxidized, there was a slight decrease in the free sulphur, and a very small decrease in sulphate. The most disappointing feature of this run was the persistence of the free sulphur in the coke. The vacuum, apparently, was inefficient as far as the removal of the free sulphur was concerned.

LONG ROASTING BETTERS COKE BUT LITTLE

Run No. 2 shows the effect of higher temperature on the results. Under these conditions more of the free sulphur is eliminated, but the final result is far from satisfactory. In No. 5 run the effect of long-continued roasting is shown. The result is much better oxidation of the ferrous sulphide, but this improvement is counterbalanced by the excessive formation of sulphates. The long roasting does not have much effect on the elimination of free sulphur, the obstinate retention of this free sulphur being the chief difficulty in any possible use of this process for the desulphurization of coke.

The desulphurizing effect of air on No. 2 is shown to be small by the results from run No. 9. By alternating the roasting and vacuum as in run No. 10, somewhat more sulphur is eliminated than in the previous run; but much free sulphur is still retained. By putting the air for the roast under 4-lb. pressure, and alternating this with the vacuum—as in run No. 11—still better results were obtained; but again the results gave no promise of industrial utilization.

WHEREIN THE MUCH-COMMENDEED PROCESS FAILS

Summary and Conclusions—It is possible to draw the following conclusions from this investigation of the desulphurizing effect of air on coke:

(1) At temperatures near 500 deg. C., it is possible to oxidize the larger part of the ferrous sulphide in coke to iron oxide and free sulphur, without causing any appreciable oxidation of the coke itself.

(2) The free sulphur produced as just described is retained in the coke in an adsorbed form. It has been found impossible to remove this from the coke completely, and even part removal has been difficult. Several methods have been tried and the results may be briefly summarized as follows:

(a) *Vacuum*.—The application of a vacuum to the coke at the temperature at which the coke is roasted is inefficient. Little or no free sulphur is drawn out of the coke by this method.

(b) *Higher Temperature*.—From an industrial standpoint, the temperature used in the secondary stage of the process to remove the free sulphur should be the same as that used in the primary stage of roasting the coke, as it is impracticable to heat the coke after once it has been cooled. On the other hand, the coke cannot be heated much above 500 deg. C., so that there is an upper limit to the temperature—say 650 deg. Raising the temperature of the process to this latter figure has little added effect in the elimination of the free sulphur.

(c) *Secondary Roasting*.—By this method the passage of air through the coke is continuous beyond the point where the available ferrous sulphide has been oxi-

dized to free sulphur. The results showed some added elimination of the free sulphur, and by the long-continued roasting, more of the ferrous sulphide was oxidized. An unfavorable feature of this long roasting was the excessive formation of sulphates.

(d) *Alternate Repeated Roasting and Vacuum Treatment*.—This method for reducing the free sulphur was tried both with the air at ordinary pressure and with a pressure 4 lb. higher than atmospheric. The result was a somewhat increased elimination of the free sulphur, but even then the major part of it remained in the coke.

(3) This investigation has indicated that the industrial desulphurization of coke by air is not practical as far as the methods which have been tested would apply. The chief difficulty in the application of the process lies in the tenacity with which the free sulphur is retained by the coke. If a method could be found for the complete removal of this free sulphur, metallurgical coke could undoubtedly be improved by the air treatment, for the solid-solution sulphur and the remaining ferrous sulphide enclosed in the coke-walls do not have as great a contaminating effect on the iron in the upper planes of the blast-furnace as has that part of ferrous sulphide which is capable of oxidation by this process.

Training Miners Adds to Their Efficiency

ALTHOUGH the literature of mine engineering is extensive, there is nothing in print in this country, and very little in England, which could enlighten the miner as to the methods by which he could attain maximum earnings by increasing the efficiency of his work at the face. Inquiry into the inequality of miners' earnings resulted in the Hudson Coal Co. assigning instructors in the actual work of mining to the ten or twelve employees in each operation whose earnings were least. This effort has been continued long enough to show that by instruction thus given, the average earnings of a group of miners thus selected can be increased \$1 to \$1.25 per day. This instruction covers the proper placement of the hole, the angle, depth and size it is to be drilled, the character and quantity of explosives to be used, the method of tamping, etc.

Honnold Says Producers Will Make Money In 1923—Maybe as Much as 6 Per Cent

"Coal producers will make some money this year," Dr. F. C. Honnold, secretary-treasurer of the Illinois Coal Operators' Association, told the *Chicago Journal of Commerce* in an interview the other day, "but their profits will not be large. The average company will do well to make 6 per cent on its investment."

Dr. Honnold prophesied that during the next three or four years a considerable number of operating concerns that sprang up mushroom-like during the period of inflation following the war will collapse in bankruptcy, but that many of the larger and stronger companies, having learned some vital truths about their industry by weathering that same period of inflation, will be able to show a fair profit in spite of restricted demand and a general tendency toward reduced prices of coal.

Speaking of Illinois, he said conditions are "not altogether satisfactory." There were then 5,000 cars of unbilled coal on mine tracks. Of these, 1,250 were loads of screenings—sizes that ordinarily are short at this time of year. Illinois mines are operating between 33½ and 40 per cent of their capacity as compared with a normal of 85 per cent. As many as fifty Illinois mines are down either temporarily for repairs or for the summer.



Problems of Operating Men

Edited by
James T. Beard



Firebosses Who Use Electric Cap Lamps

E'ctric Lamp Gives Good Light—Is Not Extinguished in Bad Air—Expedites Work—Fireboss Can Travel Faster, Examine Larger Territory

REPLYING to William Dickinson's letter condemning the use of electric cap lamps by firebosses, *Coal Age*, March 29, p. 530, permit me to say that I have carried an electric cap lamp in my belt when performing the duties of fireboss and have found it a great advantage.

Like Mr. Dickinson, my experience in firebossing began in England (Lancashire), when such a thing as an electric lamp was not known. However, I feel that it should be impressed on the minds of all mining men that we are becoming more enlightened every day in regard to conditions, methods and appliances that make mining safer.

FOUND CAP LAMP A GREAT ADVANTAGE

It had always been my practice in firebossing to carry no other light than that of an approved safety lamp, until a few months ago when I came into possession of an electric cap lamp, which I have since carried in my belt when making my rounds in the morning. The lamp gives a good light and enables me to travel faster through abandoned places and, particularly, when climbing over falls.

To my mind, it is ridiculous to argue that the bright glare of the lamp blinds the vision so that the fireboss cannot see the faint gas cap that may form on a safety lamp. The fireboss who knows his business will not carry the electric lamp on his head. Carried in the belt, the light rays are reflected downward and do not hinder or prevent a fireboss from making an accurate test for gas.

On the other hand, the bright light is of great assistance to him if he has to restore a portion of brattice that has been broken down and which the fireboss must replace when making his rounds, in order to keep the place free from gas. If this is not done, the man who works there must be kept out of his place, until the regular bratticeman gets around to do the work.

AVOIDS RISK OF GETTING IN THE DARK

Still another advantage that can be claimed for the electric lamp, in the work of firebossing, is that it avoids the possibility of a man being left in the dark if his safety lamp is extinguished. This often happens when he is compelled to climb to the top of the coal to make a test in a place 10 or 12 ft. high.

It has frequently been my lot to lose my light in

such cases. I could not tell whether the flame was knocked out by a jar or extinguished by gas. At those times, however, it was my duty to retreat to a place of safety to relight the lamp. This was generally a difficult thing to do, because of having to travel in the dark, and one can readily understand the advantage of the electric lamp in such a situation.

Let me say, again, that it is time for all mining men to appreciate the advantage there is in these new methods. Suppose a part of a fireboss territory accumulates blackdamp. In passing through such places, he is almost sure to lose his light, whereas if he has an electric lamp hanging to his belt, he need have no fear of being left in the dark wherever he goes.

Frontier, Wyo.

JAMES ROBERTS.

ANOTHER LETTER

AFTER reading William Dickinson's letter, which appeared in *Coal Age*, March 29, p. 530, where he claims that, for a fireboss to carry an electric cap lamp with him when making his rounds in the morning, is a dangerous practice, I am inclined to disagree with our friend on that point.

We all realize that an electric cap lamp has no value in the matter of testing for gas. No one questions that fact; but when Mr. Dickinson says that, for a fireboss having a large district to cover, carrying such a lamp "would prove a menace in more ways than one," it is hard to know his reason for making such a statement.

As far as I have observed, his only reason for condemning the cap lamp in firebossing is that a fireboss' time is limited and he has no spare moments to be occupied in hiding his electric lamp when making a test for gas. This appears to me as a very slight pretext for depriving our firebosses of the many advantages to be derived by carrying along an electric lamp when making their rounds.

CAN EXAMINE A LARGER TERRITORY

Allow me, therefore, to give my reasons why a fireboss should use either an electric cap lamp or a pocket flashlight. In the first place, when examining a large territory, a fireboss will make better time by using the cap lamp. There is no doubt but that he can make a better examination of the roof and sides of all the working places, haulageways and travelingways, in his district, by making good use of the electric lamp he carries.

Judging from the reference Mr. Dickinson makes, with regard to the fireboss having no time to spare to hide his electric lamp when about to make a test for gas, it may be assumed that he is speaking of making a percentage test, which requires the lowering of the flame of the lamp and estimating the height of the cap should any be present.

If that is his practice he must have a small territory to examine. In most instances, I have found it impossible to get around in adopting such measures. Instead, I have used what I would call the accumulative test, by observing the appearance and action of the normal flame. I believe this has afforded equal satisfaction and safety as would be obtained by making a more accurate test to determine the percentage of gas, by lowering the flame and observing the height of the gas cap that may be formed in the lamp.

REVERSE CAP WHEN MAKING TEST FOR GAS

Of course, if a fireboss comes upon a large body of gas it is necessary for him to take more time and examine carefully to ascertain the real conditions of the place. He must then lower his flame and make a careful test. At such times, however, it is an easy matter for him to turn his cap lamp to the side of his head or turn it back so as to shine behind him, whichever he may choose. The radius of illumination of a cap lamp covers but a small area and when the cap is turned about, as I have mentioned, the glare of the lamp will not interfere with the test he makes.

Before closing, I cannot forbear to say that a fireboss who finishes his shift in the condition described by Mr. Dickinson, who says that, after shedding his coat, vest and overshirt, his undershirt and trousers would be wet with the perspiration that poured from his body. This would seem to indicate, then, that our friend did not lose much time in stopping to lower his flame and make a careful test in each place examined, as I had feared. It is my conclusion that all firebosses should carry with them either a pocket flashlight, or an electric cap lamp, when making their rounds.

W. W. H.

Clinton, Ind.

Danger in Use of Black Powder

Local explosion in Pocahontas field kills ten men—Miners compelled to use black powder in many of the mines—Need of law requiring exclusive use of permissible powder.

I WAS much impressed with the remarks of "Safety Inspector," writing from Welch, W. Va., whose letter appeared in *Coal Age*, April 19, p. 645, in regard to the relative danger in the working of non-gaseous and gaseous mines. He draws attention to the discussion of explosions occurring in gaseous mines as not being complete without referring equally to the danger of working non-gaseous mines.

Attention is drawn in that letter to the fact that coal dust is a most dangerous factor in the use of explosives. To my mind, this is one point that seems to be given little attention by many writers when treating the subject of mine explosion. This is particularly true where the explosive in use is black blasting powder.

Only a short while ago, there occurred a dust explosion, in the S. J. Patterson mine at Arista, in the Pocahontas field, in this state. The explosion caused the death of ten men, although its effect was comparatively local. According to the evidence gathered, the accident undoubtedly resulted from the accumulation of coal dust in or near the working places. Black powder was in use for blasting in the mine and the accumulated dust had been raised and ignited by the flame of an improper shot.

Any one who has had experience in the use of black blasting powder knows that when shots are fired, the

flame not only fills the place but often extends a considerable distance back on the road. No matter how careful a company may be in requiring the loading out of the bug dust and fine coal from all working places, there is always enough fine coal dust that has accumulated in the gob and settled on the ribs and timbers along the road, and this is thrown into suspension in the air by the concussion when a shot is fired.

In fact, if the mine is dry and dusty it is impossible to keep the air free from dust, which is constantly stirred up by the cars being hauled in and out of the mine and by the various operations going on in the workings. It is this condition that makes the use of black powder extremely dangerous, because of the large volume of flame produced in firing.

Since the explosion in the Arista mine, the rule has been adopted in that mine, requiring the exclusive use of permissible powder; but the other mines in that vicinity do not seem to have profited by the lesson. Although these mines are equally dry and dusty and have practically no spraying or humidifying systems installed, they are still permitted to continue using black blasting powder in breaking down the coal. The condition is rendered more particularly dangerous because of the unskilled labor employed and the absence of any rules or regulations regarding the handling of the powder and the charging and firing of the shots.

STRANGE INDIFFERENCE TO DANGER

It is hard to understand the indifference manifested regarding the use of black powder in these mines. In most cases, I would say, that the miners of the Pocahontas field are compelled to use black powder. In some instances even, the use of permissible powder has been positively forbidden by the companies operating the mines. I want to ask, Will our state mining department wait until the horses are stolen, before closing the stable doors?

In my experience I have found most non-gaseous mines ventilated by a single continuous air current, which everyone knows is a poor system of ventilation. Not only that, but those mines seldom have any rules or regulations restricting the time of firing shots, or limiting the amount of the charge, or providing for the inspection of the holes by competent inspectors, before charging and firing.

Instead, the miners are permitted to follow their own sweet will, charging and firing their holes how and when they please. The consequence is that the air currents, in these mines, continually carry a large amount of fine dust and are laden heavily with the smoke and gases produced by the shots. Throughout the shift, the men are compelled to breathe air that is injurious to health, to say nothing of the danger to which they are exposed by reason of a possible explosion occurring in some working place and being extended throughout the mine owing to the explosive condition of the mine air.

In closing, let me say there are several explosives, on the market, that are recommended by the U. S. Bureau of Mines and their use is also advocated by the West Virginia State Mining Department. Why should not the use of these explosives be made compulsory by law? Why should our mines be permitted to take chances with an explosive that has, in many instances, proved extremely dangerous? The subject is certainly worthy of careful consideration.

Springton, W. Va.

MINE WORKER.

Inquiries Of General Interest

Ascertaining Explosibility of Methane in Oxygen

Explosibility of Methane in Oxygen Mixture
Questioned—Lower Inflammable Limit of the
Mixture Calculated—Explosive Point Undefined

AT THE meeting of our mining class, the other night, a question arose regarding the explosibility of a mixture of nine cubic feet of methane (CH_4) in fifty cubic feet of oxygen. The question was asked: "Would such a mixture explode when contained in a vessel and a light applied?" Our instructor claimed that there would be no explosion. His reason for this conclusion is not clear to me and I will be grateful to see the matter explained in *Coal Age*. The most of us were inclined to think that this mixture was explosive.

STUDENT.

Burnett, Wash.

The question of ascertaining at what point an ignitable gas will explode when the gas is added to an atmosphere of air, or to one of pure oxygen, can only be answered approximately, since the explosion of the mixture will depend not alone on the relative proportions of the gases forming the mixture, but on their uniform distribution, in order to bring about an intimate contact of the respective molecules throughout the entire volume and insure the necessary rapidity of combustion at every point. Much, also, depends on the intensity of the flame or spark producing ignition.

This condition is fully explained in reference to determining the lower explosive limits of methane in air, in *Mine Gases and Ventilation*—Beard, Second Edition, page 98. As there explained, the lack of uniform distribution of the gas in the air is the cause of the sharp snapping and crackling that is at times observed within a safety lamp introduced into a body of sharp gas. Actual explosion depends on the same condition existing throughout the mass of the mixture; but there is always a gradation each way, from the maximum explosive point to the lower and the higher explosive limits of the gas, the intensity of the explosion growing less and less till it ceases altogether.

On the other hand, the theoretical inflammable limit of a mixture of methane and oxygen is readily calculated. It is the point at which the heat generated, per pound of gas, in the complete combustion of the gas, is equal to the heat absorbed by the products of combustion and the excess atmosphere. Beyond this point, the excess of heat generated is manifested in the inflammation of the mixture. Briefly explained, the process is as follows:

The equation representing the combustion of methane (CH_4) in pure oxygen (O_2) is

	$\text{CH}_4 + 2\text{O}_2 = \text{CO}_2 + 2\text{H}_2\text{O}$			
Molecular weights,	16	64	44	36
Relative weights,	1	4	2½	2½

From a table of Heats of Combustion (*Mine Gases*

and Ventilation, p. 66), the heat generated per pound of methane, burning to carbon dioxide and water vapor, is given as 23,513 B.t.u. Now, to find the heat absorbed by the products of combustion, carbon dioxide (CO_2) and water vapor (H_2O), multiply the specific heat of each of the products, by its relative weight per pound of methane, and that result by the rise in temperature above 32 deg. F., which in this case is $1,200 - 32 = 1,168$, the temperature of ignition of methane being 1,200 deg. F. Then, the specific heat of carbon dioxide being 0.2163, the heat absorbed, per pound of methane consumed is

$$0.2163 \times 2\frac{1}{2} \times 1,168 = 694.726 \text{ B.t.u.}$$

The specific heat of water being 1, its relative weight in this case 2½ lb. and rise of temperature $212 - 32 = 180$ deg., gives for the heat absorbed by the water, $1 \times 2\frac{1}{2} \times 180 = 405 \text{ B.t.u.}$ Again, the latent heat of steam being 970.4 B.t.u. per pound, gives $970.4 \times 2\frac{1}{2} = 2,183.4 \text{ B.t.u.}$ absorbed in turning the water into steam. Finally, the specific heat of water vapor being 0.4805, its relative weight in this case 2½ lb., and the rise in temperature of the steam $1,200 - 212 = 988$ deg. F., the heat absorbed by the steam is $0.4805 \times 2\frac{1}{2} \times 988 = 1,068.152 \text{ B.t.u.}$ This makes the total heat absorbed by the water, converted into steam at 1,200 deg. F., $405 + 2,183.4 + 1,068.152 = 3,656.552 \text{ B.t.u.}$ per lb. of methane consumed. The total heat consumed by the products of combustion is, therefore, $694.726 + 3,656.552 = 4,351.278 \text{ B.t.u.}$ per lb. of methane consumed.

But, the heat generated being 23,513 B.t.u. and that absorbed 4,351.278 B.t.u., leaves an excess of heat 19,161.722 B.t.u. to be absorbed by the oxygen remaining unburned. In a large atmosphere of oxygen, this heat would be quickly dispersed, making the temperature too low for the ignition of the gas. The point is, therefore, to find what weight of oxygen will be required to absorb this excess heat and give a rise of temperature $1,200 - 60 = 1,140$ deg. F., assuming the original temperature of the oxygen atmosphere to be normal, or 60 deg. F.

The specific heat of oxygen being 0.2175, the heat absorbed, per pound, for this rise of temperature is $0.2175 \times 1,140 = 247.95 \text{ B.t.u.}$ Therefore, the weight of oxygen required to absorb the excess heat, in the burning of a pound of methane and raising the temperature to the point of ignition of the gas (1,200 deg. F.) is $19,161.722 \div 247.95 = 77.2 \text{ lb.}$ This makes the total weight of oxygen, per pound of methane burned, $77.2 + 4 = 81.2 \text{ lb.}$

The ratio by weight, methane to oxygen, is then 1:81.2; but the density of oxygen being twice that of methane, the volume ratio is 1:40.6 when inflammation takes place. The volume of the mixture, per unit volume of methane is then $1 + 40.6 = 41.6$, and the percentage of gas in the mixture is $100 \div 41.6 = 2.4$ per cent.

In conclusion, it is observed, in the equation previously given expressing the complete combustion of methane, the maximum explosive point is when the volume ratio, methane to oxygen, is 1:2; or 1 volume of methane in 3 volumes of the mixture, giving $100 \div 3 = 33\frac{1}{3}$ per cent of methane. In the proposed mixture of 9 cu.ft. of methane with 50 cu.ft. of oxygen, the percentage of methane is $(9 \times 100) \div 59 = 15.2$ per cent. This being somewhat less than one-half the percentage of methane at its maximum explosive point, our judgment is that the mixture is not explosive, under ordinary conditions of ignition.

Examination Questions Answered

Examination for Mine Managers, Springfield, Ill., Mar. 19, 1923

(Selected Questions)

QUESTION—In a coal field two miles square, both openings are at the lowest point of the property and the seam rises on a grade of $2\frac{1}{2}$ per cent for a distance of 6,000 ft. The depth of strata at the openings is 210 ft. and the surface is perfectly horizontal over the whole extent of the property. The ventilation is produced by a forcing fan 15 ft. in diameter. It is found to be unable to supply the lawful quantity of air at the face of the workings. Therefore, with a view to economy, what means would you adopt to insure the lawful amount of ventilation for the mine?

ANSWER—Assuming that all possible has been done to increase the circulation by cleaning up the airways, enlarging the breakthroughs, splitting the currents and shortening the distance the air must travel, the next step is to sink an air shaft at the most feasible point back in the workings and near the line of the main headings. The location of this air shaft should be determined by a careful study of the proposed plan of ventilation, so that the entire air current produced by the fan can enter and pass through the mine in two or more direct currents and no return airways will be required. The seam rising on a grade of $2\frac{1}{2}$ per cent for 6,000 ft. will give a total rise in that distance of $6,000 \times 0.025 = 150$ ft. and make the depth of air shaft required only 60 ft. The sinking of one or more air shafts at convenient points in the workings where the depth from the surface to the coal is but 60 ft. would prove an important factor in the economy of ventilation and the future operation of the mine.

QUESTION—Explain how you would determine the safe working load for a seasoned hemlock mine prop 10 in. square and 10 ft. long, assuming that the crushing load per square inch is 5,300 lb.?

ANSWER—A mine prop whose diameter in inches is equal to its length in feet presents, practically, an equal resistance to crushing or bending. Therefore, the strength of a post 10 in. square and 10 ft. long can be estimated on its resistance to crushing. In mine timbering, the safe working load may be taken as one-third of the crushing load or, in this case, $\frac{1}{3}(5,300) = 1,766$ lb. per sq.in. The sectional area of the post being $10 \times 10 = 100$ sq.in., the required safe working load is $(100 \times 1,766) \div 2,000 = 88.3$ tons.

QUESTION—If 65,000 cu.ft. of air is passing through a mine, per minute, what amount of methane must be picked up by the air current to render the return air dangerous?

ANSWER—Very much will depend on the condition of the mine with respect to dust and the inflammability of the coal. If the air current is free from any appreciable quantity of dust, 2 per cent of methane in the return airway would not be dangerous. The danger line, calling for the adoption of measures to safeguard operations in the mine, may be assumed as reached

when the return air contains, say 3 per cent of gas. If the volume of air entering the mine is 65,000 cu.ft. per min., this is $100 - 3 = 97$ per cent of the return current under the assumed conditions, making the total volume passing in the return airway, $65,000 \div 0.97 =$ say 67,000 cu.ft. per min. In that case, the volume of methane the air current must have absorbed is $67,000 - 65,000 = 2,000$ cu.ft. per min.

QUESTION—How many tons of coal will be hauled in 8 hr., by an electric motor making 22 trips and hauling an average of 25 cars per trip, if the average net weight of coal, per car, is 4,500 lb.?

ANSWER—Assuming the motor makes 22 round trips in 8 hr., hauling an average of 25 cars per trip, the average capacity of each car being 4,500 lb. of coal, the weight of coal hauled in the given time is $(22 \times 25 \times 4,500) \div 2,000 = 1,237.5$ tons.

QUESTION—What material, in your judgment, should be kept at fiery or gaseous mines to meet emergencies that are likely to arise from explosions of firedamp?

ANSWER—The mine should be equipped with a trained first-aid team and have on hand the necessary first-aid supplies and apparatus to enable the team to do effective work. This should include an approved type of breathing apparatus and oxygen tanks, together with the necessary bandages, splints, one or more pulmotors and the usual restoratives, olive oil, etc., for the treatment of burns and electric shock. The mine should be equipped with a good underground hospital, supplied with stretchers, blankets and other necessities for the giving of first-aid treatment to the injured. There should also be provided a suitable mine ambulance.

QUESTION—What device would you use to remove gas from holes and cavities in the roof of rooms and entries?

ANSWER—No attempt should be made to remove gas from holes and cavities in the roof or other void places, by brushing it out with a coat or other garment. To remove the gas, the air current passing through the place should be suitably increased and a special brattice erected to deflect the air into the hole or cavity in the roof or other void place where it is lodged.

QUESTION—Do the furnace and fan produce ventilation as well in shallow mines as in deep ones and why?

ANSWER—The action of a mine furnace depends primarily on the depth of the upcast or furnace shaft. The greater the depth of this shaft, the greater the height of the heated air column, which determines the ventilating pressure in the mine. Hence, furnace ventilation is not as effective in a shallow mine as where the coal lies at a greater depth below the surface.

On the other hand, in fan ventilation, a deep shaft means an increased mine resistance; and a larger proportion of the work of the fan is then absorbed in passing through the shafts. For that reason, a ventilating fan does more effective work in the ventilation of a shallow mine than a deep one.

QUESTION—Does a high water gage always indicate a large quantity of air passing? What does a low water gage with a large quantity of air passing indicate?

ANSWER—A high water gage may result from an increased mine resistance due to obstructed airways, and it is, therefore, no index of a large quantity of air in circulation.

When a large quantity of air is circulated under a low water gage, it indicates a small mine resistance, owing to large unobstructed airways.

58 Bids Submitted to Navy Department On 450,000 Tons of Bituminous Coal

Fifty-eight bids were submitted to the Navy Department and opened May 23 for supplying approximately 450,000 tons of bituminous or semi-bituminous coal for delivery at navy yards and naval stations during the fiscal year beginning July 1, next. Three bids were informal and were thrown out. They were those of the Lake & Export Coal Corporation, Huntington, W. Va.; Raleigh Smokeless Fuel Co., New York, and Coleman & Co., Philadelphia. The principal remaining bids were as follows:

30,000 tons, for delivery at Boston—Dexter & Carpenter Co., New York, \$7.58 per ton, f.o.b. Navy Yard; Maritime Coaling Co., East Boston, \$8.55, barge delivery; W. A. Marshall & Co., New York, \$7.41, rail delivery; Matlack Coal & Iron Co., New York, \$7.39, rail delivery; Metropolitan Coal Co., Boston, \$9.35, truck delivery; Weston Dodson & Co., Bethlehem, Pa., \$9.22, rail delivery.

6,000 tons, for delivery at Chelsea, Mass.—Metropolitan Coal Co., \$9.55 per ton; Weston Dodson & Co., \$11.72.

9,000 tons for delivery at Brooklyn, N. Y.—Cosgrove & Co., Johnstown, Pa., \$6.57 per ton; H. B. Haff, New York, \$7.31; George D. Harris & Co., New York, \$6.30; W. A. Marshall & Co., \$7.02; Matlack Coal & Iron Co., \$6.57; Morrisdale Coal Co., Philadelphia, \$7; Pennsylvania Coal & Coke Corp., New York, \$3.92; Quemahoming Coal Co., Somerset, Pa., \$7.42, alternate \$7.28; \$7.05, \$6.92 and \$6.76; Titan Fuel Corp., New York, \$6.49; Weston Dodson & Co., \$8.22.

57,500 tons, for delivery at New York—W. H. Bradford & Co., Inc., Philadelphia, \$6.19 per ton at coal pier, New Jersey, \$6.44 at coaling plant, Brooklyn. \$6.49 at Brooklyn naval hospital; Burns Bros., New York, \$7.04 at coal pier, New Jersey, \$7.39 at Brooklyn coaling plant, \$7.39 at Brooklyn naval hospital; Consolidation Coal Co., \$7.02 at New Jersey coal pier, \$7.24 at Brooklyn coaling plant, \$7.29 at Brooklyn naval hospital; Cosgrove & Co., Johnstown, Pa., \$6.23 at New Jersey coal pier; Dexter & Carpenter Co., New York, \$6.51 at New Jersey coal pier, \$6.74 at Brooklyn coaling plant, \$6.79 at Brooklyn naval hospital; W. A. Marshall & Co., \$6.145 at New Jersey coal pier, \$6.345 at Brooklyn coaling plant; \$6.395 at Brooklyn naval hospital; Morrisdale Coal Co., \$6.09 at New Jersey coal pier, \$6.45 at Brooklyn coaling plant, \$6.45 at Brooklyn naval hospital; Sellar Coal Co., New York, \$6.54 for entire amount, \$6.42 for part, at New Jersey coal pier, \$6.78 for all, \$6.65 for part, at Brooklyn coaling plant, \$6.83 for all, \$6.70 for part, at Brooklyn naval hospital; Titan Fuel Corp., \$6.09 at New Jersey coal pier, \$6.34 at Brooklyn coaling plant or naval hospital; Weston Dodson & Co., \$8.74 at New Jersey coal pier, \$9.74 at Brooklyn coaling plant or naval hospital; H. B. W. Haff, \$7.18 at Brooklyn coaling plant or naval station.

45,000 tons, for delivery at Philadelphia—Cosgrove & Co., \$6.19; Davis Coal & Coke Co., \$6.44; Dexter & Carpenter Co., \$6.54; Emmons Coal Mining Co., \$6.46; Fidelity Coal Mining Co., Philadelphia, \$5.83; W. A. Marshall & Co., \$5.71; alternate \$5.85; Maryland Coal & Coke Co., Philadelphia, \$5.92; alternate \$6.09; Matlack Coal & Iron Co., \$5.99; Pennsylvania Coal & Coke Corp., \$3.92; Weston Dodson & Co., \$8.84; Whitney & Kemmerer, Philadelphia, \$6.37.

20,000 tons, for delivery at Philadelphia—W. H. Bradford & Co., Inc., \$6.06 at coaling piers, \$6.24 at wharf; Dexter & Carpenter Co., \$6.29 at coaling piers, \$6.44 at wharf; Empire Coal Mining Co., \$6.23 at pier, \$6.41 at wharf; Fidelity Coal Mining Co., \$5.56 at pier, \$5.72 at wharf; W. A. Marshall & Co., \$5.645 at pier, \$5.78 at wharf; Maryland Coal & Coke Co., \$5.67 at pier, \$5.84 at wharf; Morrisdale Coal Co., \$5.52 at pier, \$5.67 at wharf; Quemahoming Coal Co., \$6.04 at pier, alternate \$6.17 \$6.40 \$6.54, \$5.88, \$6.22 at wharf, alternate \$6.35, \$6.58, \$6.72, \$6.06; Weston Dodson & Co., \$8.59 at pier, \$9.59 at wharf; Whitney & Kemmerer, \$6.12 at pier, \$6.24 at wharf.

35,100 tons, for delivery at Annapolis, Md.—Davis Coal & Coke Co., \$6.94; Dexter & Carpenter Co., \$6.50; Hall Bros. Co., Inc., Baltimore, \$6.70; Hulmer Coal & Transportation Co., Philadelphia, \$7.04; Iron Trade Products Co., Pittsburgh, \$6.84; alternate \$7.25; W. A. Marshall & Co., \$6.71; Quemahoming Coal Co., \$6.59; alternate \$6.57, \$6.72, \$6.95, \$7.09, \$6.43; Weston Dodson & Co., \$9.59.

50,000 tons, for delivery at Washington, D. C.—C. G. Blake Co., Cincinnati, \$7.32 per ton; Davis Coal & Coke Co., \$6.64; Dexter & Carpenter Co., \$6.32, alternate \$6.14; Low Volatile Consolidated Coal Co., Beckley, W. Va., \$7.88 (25,000 tons); W. A. Marshall & Co., \$6.20; Matlack Coal & Iron Co., \$6.04; Pennsylvania Coal & Coke Corp., \$6.76; Quemahoming Coal Co., \$6.79, alternate \$6.42, \$6.29; Weston Dodson & Co., \$8.84; White Oak Coal Co., Macdonald, W. Va., \$7.06 (25,000 tons).

33,000 tons, for delivery at Indian Head, Md.—Davis Coal & Coke Co., \$7.41 per ton, alternate (12,000 tons), \$6.77; Emmons Coal Mining Co., \$7; Fidelity Coal Mining Co., \$6.19; W. A. Marshall & Co., \$7.25; Matlack Coal & Iron Co., \$6.59; Weston Dodson & Co., \$8.91.

10,000 tons, for delivery at Indian Head, Md.—Consolidation Coal Co., \$7.30 per ton; Davis Coal & Coke Co., \$7.14; Emmons Coal Mining Co., \$6.57; W. A. Marshall & Co., \$7.22; Matlack Coal & Iron Co., \$6.59.

10,000 tons, for delivery at Dahlgren, Va.—Dexter & Carpenter Co., \$6.49 per ton, rail delivery; W. A. Marshall & Co., \$6.68, rail delivery, \$6.82 barge delivery; Matlack Coal & Iron Co., \$6.59, rail delivery; Weston Dodson & Co., \$8.91, rail delivery.

22,000 tons, for delivery at Hampton Roads, Va.—C. G. Blake Co., \$6.88 per ton; Dexter & Carpenter Co., \$6.18, alternate \$6.11; Fayette Smokeless Fuel Co., \$7.28; L. A. Snead Co., \$7.15; Weston Dodson & Co., \$8.02; White Oak Coal Co., \$7.45 (12,000 tons).

45,000 tons, for delivery at Norfolk—Crozier Pocahontas Co., Philadelphia, \$7.45 per ton (22,500 tons); Dexter & Carpenter Co., \$5.73, alternate \$6.18, \$6.11; Fayette Smokeless Fuel Co., \$6.88; Low Volatile Consolidated Coal Co., \$8.008; Pocahontas Fuel Co., Inc., New York, \$7.44; L. A. Snead Co., \$7.15; Weston Dodson & Co., \$8.47; White Oak Coal Co., \$7.773 (24,000 tons).

5,500 tons, for delivery at Portsmouth, Va.—C. G. Blake Co., \$6.88; Dexter & Carpenter Co., \$6.18, alternate \$6.11; Fayette Smokeless Fuel Co., \$7.28; Pocahontas Fuel Co., Inc., \$7.44; L. A. Snead Co., \$7.25; Weston Dodson & Co., \$8.47.

10,000 tons, for delivery at Charleston, S. C.—C. G. Blake Co.,

\$7.83 per ton; Crozier Pocahontas Co., \$7.84; Dexter & Carpenter Co., \$6.53, alternate \$6.46; Wm. Johnson & Co., Charleston, \$7.52; Pocahontas Fuel Co., Inc., \$7.834; Roach Creek Coal Co., \$5.85 (5,000 tons); Sloss Sheffield Steel & Iron Co., Birmingham, Ala., \$6.30; L. A. Snead Co., \$7.54.

8,700 tons, for delivery at Pensacola, Fla.—Adams, Rowe & Norman, Birmingham, \$3.03, alternate \$3.31; Cary & Co., Pensacola, \$3.60, alternate \$3.33; Frederick Gilmore & Co., Pensacola, \$3.67; John A. Merritt & Co., Pensacola, \$5.99, alternate \$5.44, \$5.37; National Coal & Coke Co., Birmingham, \$2.25; Roach Creek Coal Co., \$3; Sloss Sheffield Steel & Iron Co., \$3.

2,000 tons, for delivery at Great Lakes, Ill.—Baumer Coal Co., St. Louis, \$2.76; Chicago, Wilmington & Franklin Coal Co., Chicago, \$3.64, alternate \$3.08, \$2.80; Cosgrove & Co., \$3.30; Crear & Clinch Co., Chicago, \$3.35; Dexter & Carpenter Co., \$8.45, alternate \$8.16; B. W. Gilmore & Co., Chicago, \$3.24, alternate \$3.90; Great West Coal & Lumber Co., Chicago, \$3.248; Howl-Coulter Coal Co., Chicago, \$3.36; Lake & Export Coal Sales Corp., Chicago, \$2.65; O'Gara Coal Co., Chicago, \$3.64; Old Bend Coal Corp., Chicago, \$3.64; Peabody Coal Co., Chicago, \$3.64; Reliable Coal & Mining Co., Chicago, \$2.688; Roach Creek Coal Co., \$3; Richardson Sons, Chicago, \$2.91.

30,000 tons bituminous screenings, for delivery at Great Lakes, Ill.—Baumer Coal Co., \$1.87; Chicago, Wilmington & Franklin Coal Co., \$1.95, alternate \$1.90; Cosgrove & Co., \$2.15; Crear & Clinch, \$2.07; Dexter & Carpenter Co., \$7.60; B. W. Gilmore & Co., \$2.17, alternate \$2.57, \$2.69; Great West Coal & Lumber Co., \$2.52; Howl-Coulter Coal Co., \$1.79; Lake & Export Coal Sales Corp., \$1.75; O'Gara Coal Co., \$2.69; Old Bend Coal Corp., \$1.96; Peabody Coal Co., \$1.96; Reliable Coal & Mining Co., \$1.792; Roach Creek Coal Co., \$2.05 (10,000 tons); Richardson & Sons, \$2.52.

Convention Program of American Wholesale Coal Association Nearly Complete

The program of the seventh annual convention of the American Wholesale Coal Association, to be held in Cincinnati June 12-13, is nearing completion. The Executive Committee and Senior Council held a two days session with President Morton at Albany, N. Y., on May 10 and 11 to complete the plans for the annual convention and transact other business. The program was discussed thoroughly and



EXECUTIVE COMMITTEE AND SENIOR COUNCIL,
AMERICAN WHOLESALE COAL ASSOCIATION

Top row—Borden Covel, Boston; Ira Cochran, commissioner and traffic manager, Washington; Charles A. Owen, New York City. Middle row—C. G. McGill, Toronto; Charles L. Dering, Chicago; Russell K. Pratt, Boston; C. F. Dunn, Detroit. Bottom row—E. M. Platt, Chicago; Jay W. Johns, vice-president, Pittsburgh; Seth W. Morton, president, Albany, N. Y.; G. H. Merryweather, secretary-treasurer, Chicago; Charles L. Couch, Buffalo.

efforts are being made to have a number of speakers who will be both entertaining and instructive. Considerable time will be allotted for discussion of the problems of the association in connection with the reports of the officers for the past year. The policy of the association for the future will, of course, be determined.

Plan to Certify American Coal for Export

A start toward the establishment of export standards for coal was made at a conference in Washington May 24. Representatives of the railroads, the exporters and the government—in all some twenty-five persons—were called to Washington by Federal Fuel Administrator Wadleigh. The meeting was called with the approval of prominent producers of export coal.

Under the plan proposed the Bureau of Mines will certify to any foreign buyer the name of the district, the designation of the seam and the commercial name of the coal involved. While this falls far short of the standards of quality that many would apply on export coal, it is believed that this is a step toward safeguarding foreign buyers and reputable exporters from the poor quality of coal some exporters palm off on foreign buyers.

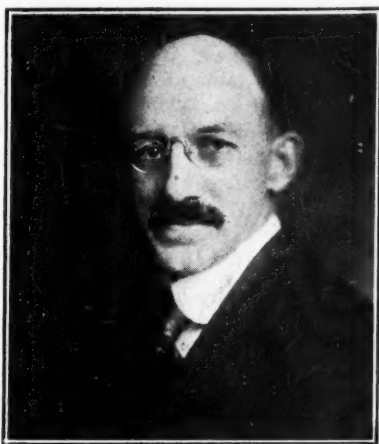
Commission Prefers Contact with Men Active in Industry; No Objection to Representation by Counsel

BY PAUL WOOTON
Washington Correspondent of Coal Age

John L. Lewis, president of the United Mine Workers of America, appeared before the President's Coal Commission on May 25. No announcement was forthcoming from the commission as to what Mr. Lewis discussed. The usual Friday conference with the press was cancelled. It is understood, however, that Mr. Lewis confined himself largely to a discussion of conditions in Europe, particularly as they have a bearing on the coal situation. Since coal is such an important factor in Great Britain's ability to compete in world markets, the discussion is understood to have dealt with the broader aspects of the part played by British coal in foreign trade.

Most of the week ended May 26 was devoted by the Coal Commission to conferences with the members of its staff. The various staff reports due June 1 are of unusual importance as the study of the anthracite situation, which is to be reflected in the July 1 report, is now converging to the point where conclusions are being formulated.

A report was circulated to the effect that the Coal Commission had practically served notice on the United Mine



A. E. HOLBROOK

Workers that it wants to hear from the union's officials rather than from any legal talent in its service. It was stated by a member of the commission that there is no intention whatever of dictating to anyone how he shall present his case. It is perfectly obvious that the commission prefers hearing from actual operators and from union officials rather than from attorneys, regardless of how distinguished they may be. Nevertheless it is safe to say that the commission will interpose no objection to the appearance of counsel. It may be predicted, however, that the commission will insist on addressing many of the questions which it has to ask to those actually engaged in the industry.

Apparently the commission understands that the briefs submitted to it most recently were intended for public consumption rather than for judicial consideration by the commission. Only one member of the commission seemed to be at all familiar with the material contained in these statements and it is suspected that he was assigned to read them so as to ascertain whether or not they really were intended for the commission's consideration.

The three anthracite district presidents of the United Mine Workers of America have been called to Washington for a conference with International President John L. Lewis and also with the Coal Commission. Thomas Kennedy of Hazleton, president of District 7, despite illness which had confined him to his home all week, left Saturday night in response to the call.

The Coal Commission has drafted Mr. Holbrook, now dean of the School of Mines, Pennsylvania State College, formerly assistant director of the Bureau of Mines, to investigate and report on safety methods in the coal mines. Mr. Wolfen, of the State Industrial Commission of California, and Mr. Rutledge, mining engineer of the State of Maryland, are assisting Mr. Holbrook.

Tentative Awards Made for Furnishing Coal To New York State Institutions

Bids opened on May 22 by the New York State Department of Purchases for furnishing and delivering between July 1, 1923, and April 1, 1924, approximately 167,000 net tons of bituminous slack, run-of-mine and three-quarter lump coal to various state institutions resulted in tentative awards being made on a basis of mine prices ranging from \$1.75 to \$1.80 for slack, \$2.18 to \$2.58 for run-of-mine and \$2.59 for the three-quarter lump. For supplying 640 tons of smokeless coal George D. Harris & Co., of New York City, was awarded the contract at \$2.45 per ton.

The specifications called for not more than 9 per cent of ash; sulphur not to exceed 2 per cent; volatile not to exceed 35 per cent, and not less than 13,750 B.t.u., which was interpreted to be the equivalent of good pool 11.

Pool 11 was quoted on May 21 on the New York market at \$1.85 to \$2.30 net ton f.o.b. mines.

George Hall Corporation, of Ogdensburg, obtained the contract for delivering 13,600 net tons of run-of-mine to St. Lawrence Hospital at \$2.54 per ton. Other awards made included 12,000 tons of run-of-mine to the Manhattan State Hospital to George D. Harris & Co., New York City, at \$2.49 per ton; 22,500 tons run-of-mine to Central Islip to State Coal Co., Inc., New York City, \$2.18; 1,200 net tons of three-quarter lump to Iroquois to Titan Fuel Co., New York City, \$2.59 per ton; 2,000 tons of slack to the Binghamton State Hospital to W. A. Marshall & Co., New York City, \$1.75 per ton; 10,400 net tons of slack to Buffalo institutions to the Operators Fuel Agency, Greensburg, Pa., and Weaver Coal Co., Buffalo, at \$1.80 and \$1.84 respectively, award

depending on trial shipments. Other contracts awarded included the following: Finance & Fuel Co., of DuBois, Pa., for delivering 30,600 tons of run-of-mine to eight different institutions in northern New York at \$2.48 per ton; Barnett Coal & Coke Corp., Buffalo, 18,800 tons run-of-mine to Middletown, Elmira and Sonyea at \$2.58 per ton; J. P. Burton & Co., Cleveland, Ohio, 14,300 tons run-of-mine to Rochester, Albion, Batavia and Thiells, at \$2.35 per net ton; Titan Fuel Corp., New York City, 4,300 tons nut and slack to the institution at Newark at \$2; 1,600 net tons run-of-mine to Napanoch to Steamship Fuel Corp., New York City, \$2.50, and 11,600 net tons run-of-mine to Great Meadow and Sing Sing prisons to W. G. Morton, Albany, at \$2.20 per net ton.

At the same time bids were opened for furnishing and delivering approximately 104,000 gross tons of various sizes of anthracite to institutions in various parts of the state, of which the D. L. & W. Coal Co. obtained awards at company circular of 29,800 tons of No. 1 buckwheat; 20,000 tons No. 2 buckwheat; 8,500 tons No. 3 buckwheat, 1,755 tons chestnut, 2,200 tons egg, 6,880 tons stove and 4,135 tons pea coal.

THE NATIONAL COAL ASSOCIATION is now housed in its new quarters in the Southern Building at Washington. More floor space is provided than in the old quarters and much more desirable arrangement of the office is possible. Harry L. Gandy, executive secretary of the association, is making a field trip during which he will visit a number of the coal associations in the Middle West.

THE EGYPTIAN STATE RAILWAYS are negotiating for 150,000 tons of American coal, it is understood.

Court Confirms Reading Segregation Plan

The U. S. District Court at Philadelphia on May 22 confirmed the third modified plan for the segregation of the Reading companies and ordered counsel to submit a decree for approval of the court. The decree is to be presented by June 20. The court dismissed the exceptions noted to the third plan by certain of the common stockholders and by the government. The court, however, reserved jurisdiction to trustee the coal stock as suggested by the government if there should be an unexpected delay in working out the dissolution proceedings.

Under the provisions of the plan just approved the Reading Company would issue \$63,000,000 in 4½ per cent bonds to run seventy-four years, and the Philadelphia & Reading Coal & Iron Co., divorced from the Reading Company under a decree of the U. S. Supreme Court, would issue \$31,000,000 in 5 per cent bonds to run fifty years. These bonds would be exchanged for the present 4 per cent bonds.

Objections to the plan had been made by the government and by a large number of common stockholders of the Reading companies and some of the preferred stockholders. They were based chiefly on the grounds that the plan favored the bondholders and that its adoption would mean an increase in anthracite price to the consumer.

The Reading case has been in the courts for sixteen years and has been in the Supreme Court three times. In arguing the case for the government two weeks ago Acting Attorney General A. T. Seymour intimated that if the plan were approved an appeal might be taken to the Supreme Court.

Ask Support of Public to Preserve an Independent Source of Fuel Supply

The public is called upon to give its support to the preservation of an independent source of fuel supply, and to show its appreciation of the loyal services of the mine managers and workers in the non-union coal fields during the last strike in a resolution adopted at the last session of the annual convention of the National Association of Manufacturers, held in New York City on May 14, 15 and 16. The resolution, which was presented by M. C. Atkins, of Indianapolis, chairman of the Committee on Resolutions, pledges the co-operation of the association to the U. S. Fuel Commission. It reads:

"The uninterrupted production and distribution of coal at reasonable cost is vital to our national health, safety and industry.

"With more than half of the world's coal supply within our borders, coal never became a serious problem until after attempts at governmental regulation and organized combinations to interrupt production.

"The significant words of the President of the United States, who recently declared to Congress, 'The simple but significant truth was revealed that except for such coal as comes from the districts worked by non-organized miners, the country is at the mercy of the United Mine Workers,' call for an expression of appreciation on behalf of the people of the nation of the loyal services of the managers and employees of the non-union fields, who by their uninterrupted and effective labors preserved the households, transportation and productive industry of the United States from deprivation of essential fuel.

"It is therefore in the public interest that continuing support be given to the preservation of an independent source of fuel supply, which no combination can arbitrarily close to the needs of our people.

"We extend our co-operation to the U. S. Fuel Commission and urge upon its attention that no form of collective bargaining or agreement can receive public approval that is not accompanied by practical guarantee for its interpretation and the enforcement of its terms by independent adjudication in the event of disputes. It is recommended for thoughtful consideration that all such agreements by their terms include provision for their filing in established courts of record and in the event of dispute as to their meaning be

subject to judicial interpretation, to which interpretation the parties thereto agree in advance to be bound."

At the morning session of the convention the delegates listened to an address by former Governor John J. Cornwell, of West Virginia, on "The Coal Situation," an abstract of which was printed in *Coal Age*, May 17.

Government Fuel Yard Makes Awards

The U. S. Bureau of Mines announced on May 21 the awarding of contracts for supplying bituminous coal to the Government Fuel Yards in Washington during the coming fiscal year. The awards, so far as made, are on the basis of the bids opened on May 15 and are as follows: Chesapeake & Potomac Fuel Co., 15,000 tons New River run of mine at \$4.30 per gross ton, f.o.b. mines; Fayette Smokeless Fuel Co., 30,000 tons New River run of mine at \$4.31 per ton, f.o.b. mines; White Oak Coal Co., 36,000 tons New River run of mine at \$4.48 per ton, f.o.b. mines; Commercial Coal Mining Co., 30,000 tons Pennsylvania run of mine at \$3.64 per ton, f.o.b. mines; Consolidation Coal Co., Maryland run of mine at \$7.50 delivered in barges.

W. M. Wilshire Becomes Vice President Of Carnegie Coal Co.

W. M. Wilshire has resigned as general manager of sales for the Consolidation Coal Co., New York, to become vice-president in charge of sales for the Carnegie Coal Co., Pittsburgh. The Carnegie Coal Co. has been reorganized by its president, John A. Bell, who has merged with it other extensive coal acreage and operations in the Pittsburgh district, generally known as the Bell properties.

This company now has a normal productive capacity of upward of five million tons a year. As the head of the sales department of the Carnegie Coal Co. Mr. Wilshire succeeds J. T. M. Stonerod, who is retiring from active participation in the business, his interest having been purchased by Mr. Bell, as recently announced in *Coal Age*.



W. M. WILSHIRE

For the past twenty-three years Mr. Wilshire has been associated with the Watson interests operating in West Virginia and other fields. In the sales department of the Consolidation Coal Co. he has participated actively in this company's aggressive market and trade development.

William Mann Wilshire was born and reared in Cincinnati, his grandfather having been a pioneer of the Queen City. His first schooling which led to his career in the coal business was had with the late Andrew Stevenson, then assistant general freight agent of the Baltimore & Ohio R.R. at Baltimore. In 1897 Mr. Wilshire became private secretary to the late Oscar G. Murray, at that time, with Judge John K. Cowan, a co-receiver, and subsequently president of the Baltimore & Ohio system. In this position Mr. Wilshire succeeded his brother, F. W. Wilshire, who is now vice-president in charge of sales for the Consolidation Coal Co. In 1900 W. M. Wilshire went to Chicago with the title of traffic manager for the Fairmont Coal Mining Co. From Chicago he went to Baltimore and from there to Philadelphia, as assistant to F. W. Wilshire, who was then manager of the Consolidation Coal Co. at Philadelphia, and whom he succeeded. He was in charge of the Philadelphia office, which is a most important post in the organization, for a dozen years, moving to New York in 1920 to become general manager of sales.

Convention of Michigan-Ohio-Indiana Coal Association Discusses Problems of the Retailer

(Special Correspondence)

Summed up from beginning to end, segregating the social side from the speeches, the reports from the election of officers and the general commingling of two or three elements of the coal industry, a most necessary factor to the well-being of the trade, probably the most progressive action taken at the meeting of the Michigan-Ohio-Indiana Coal Association at its sessions at Cincinnati May 22, 23 and 24, was contained in the set of resolutions offered by Charles Albright, of Cleveland, as chairman and drafted by the Resolutions Committee, composed of Mr. Albright, H. H. Deam, of Bluffton, Ind.; J. A. Van Buelen, of Grand Rapids, Mich., and Louis O'Connell, of Tiffin, Ohio.

These show a tremendous breadth of thought upon the coal retailer's problems and, briefly, call for printing of the names of the railroads on which the coal men's yards or sidings are located on their firm's stationery; compilation by members of a list of dealers in their city or district who would be acceptable as members of the organization; a record of each member's average yearly tonnage in anthracite and bituminous coal so that this data may be kept fresh for use when called for by state or federal investigating bodies; immediate notification of station agents or railway officials of empty cars on sidings or in the yards to keep equipment moving; a move to deter dealers from advancing any money for the delivery of coal other than through the deposit of a certified check on receipt of the bill of lading or the placing of this in the hands of his bank until the receipt of the bill of lading; condemnation of any sharp practice by which trade marks or any other evidence of special coals might be placed in fuel produced elsewhere or by other companies so that deception is practiced; against criticism of operators, wholesalers or any other branch of the trade, for the reason that all branches of the industry have a hard enough time to attend to their own business; formation of a committee of five from each of the three states to iron out car-shortage tangles and an endorsement of Secretary Hoover's endeavors along that line with the appointment of emergency transportation committees to assist in this work; a state and national affairs committee in each state so that the members of the organization can keep in touch with the moves for the betterment of the industry in other places.

FIVE HUNDRED PRESENT AT OPENING

Over five hundred registrations were received at the convention headquarters by Wednesday morning, when President Robert S. Magee of the Cincinnati Coal Exchange formally welcomed the visitors. President Homer C. Gill replied and the first speaker was Tom L. Lewis, of Charleston, W. Va., secretary of the New River Coal Operators Association. He spoke on "What Is the Matter with the Coal Industry?" In part he said:

"If I were to try to tell you all that there is the matter with the coal trade it would take me a week. Let's understand that this is one of the greatest basic industries in the United States and ranks second to agriculture.

"One of the great troubles with the coal man is that he has failed to recognize the power of interchange of thought—he has for years overlooked the power of organization. Operator, wholesaler and retailer each has lived in his own little world, each man for himself.

"In 1896 I worked in eastern Ohio for \$1.32 a day—they were loading coal in southern Illinois in those days for 10c. a ton. Compare that with the present mining costs, and you will see why the miners were forced to organize and why three-quarters of the producers of that time were facing bankruptcy. I helped to organize the Miners' Union because I believed in education, conciliation and arbitration and respect for other people's rights.

"The reason that I am now opposed to miners' organizations is that they do not believe in any one of these, but recognize only one power, and that is might. In the past four years the United Mine Workers have defied the United States, from the President on down, and they have taken

two Presidents by the throat and said, 'You must surrender,' even though it was at a cost of the suffering of the people of this country.

"The result of this strife and strikes has been the formation of the President's Coal Commission, in which I have the utmost confidence. The members, I believe, will present all of the facts and will make a report that will solve some of the problems."

Following his talk came J. A. Morris, chairman of the Operating Committee of the American Railway Association. He declared that within three months work would be started upon the Cincinnati terminals that would provide adequate facilities for the movement of all coal produced below the Ohio River through the Cincinnati gateway.

"You gentlemen are interested in the question of car supply," said Mr. Morris. "I might say to you that if there was such a thing as a 100 per cent car supply we couldn't handle it. There are plenty of reasons why there is no such a thing as a 100 per cent car supply, and as one instance I might say that there is one coal dealer in Cincinnati right now who has 162 cars on track that he can't move."

In the afternoon those visiting the convention were taken on a sightseeing trip of the city and in the evening the Cincinnati Coal Exchange was the host to the conventioners at the Zoo.

MORROW GIVES GLIMPSE OF COAL OUTLOOK

Thursday's sessions opened with a talk by J. D. A. Morrow, president of the Morrow Callahan Coal Co. and better known through his association with Dr. Garfield's Fuel Administration and later with the National Coal Association. In his characteristic way Mr. Morrow summed up the evidence to give a glimpse of the coal outlook. He ran down through the essential industries, through the railway ramifications, through the textile, auto and other basic industries and showed that all of them in April and May were working at top speed, in some instances at higher velocity than they were in war times or the armistice period. Coming to the building trades he said that it was true that there had been cancellations of a hundred million dollars worth of work this month, "but we have come to the strange place that it is the cancellation of these contracts that makes news," he said.

He showed that the cost of living is really lower than it was in 1920 and that work is more plentiful, that there is a downward trend to the price of stocks in Wall Street—always a sign that some one is taking a profit—so with the cost of living down and wages up, according to his reasoning, the general purchasing power of the individual in this country is increased and matters generally are in good shape.

All the way through Mr. Morrow kept close to the effect of all of this upon coal. He showed that there was a grave possibility of the transportation facilities of the country being unable to handle the coal mined, that consumption is keeping pace with production to the point that no immense reserves can be built up.

"There are plenty of mines and plenty of labor; the big question is whether labor will work or not. Remember the anthracite agreement expires Sept. 1. Of course the Coal Commission is on the job and we are relying on it to keep things moving. Whether they will or not I do not know and I doubt if they know—without asking John Lewis first—then there is the probability of trouble looming up on April 1. All of this casts its shadows before it. There are the pessimists and the optimists—both advance their own causes and theories. It is my opinion that in four or five weeks the situation will have so straightened itself out that one can see what is ahead of the coal man for the coming year."

Following Mr. Morrow's talk came the passing of the resolutions and then the nominating committee, composed of

Raymond B. Mathers, of Richmond, Ind., chairman; M. J. Hornberger, of Youngstown; Harry Eberts, of Wyandotte, Mich., and Dewey Blocksma, of Grand Rapids, reported the choice of the following: For President, H. W. Barknecht, of Muskegon, Mich., Vice-President, Louis, O'Connell, of Tiffin, Ohio; Secretary, B. F. Nigh; Trustees, Homer C. Gill and Charles Albright, Ohio; D. T. Rolf and H. H. Deam, Indiana; C. A. Pollock and William Donker, Michigan, all of whom were elected unanimously.

The closing event of the convention was a trip down the Ohio River on the excursion steamer "East St. Louis" as guests of the Philadelphia & Cleveland Coal Co., to its big plant recently installed between North Bend and Addyston, where the details of the machinery placed there was explained by Resident Manager Parsons and his assistant Ernie Spreen.

"New Deal" in Northwest Trade?

If half the subtle predictions which are at large within coal circles in the Northwest are correct, it makes little difference what the Interstate Commerce Commission's ruling on the Northwestern rate case may be; there is going to be a new deal in the coal business. Some of the rail trade declare that the sole basis of the complaint was that the dock interests had such a large investment in the docks that it must be protected, even at the cost of upholding uneconomical methods. They declare that if the dock trade cannot meet all-rail competition it is because they have too heavy an overhead through obsolete methods.

They further suggest that it is not impossible for the rail trade to enter the dock business, shipping Illinois and Indiana coal to Lake Superior docks for storage during the summer, and distributing it through the late summer and autumn at a cost below the Eastern coal prices. This is said to be seriously under consideration. Some doubt its practicability since they believe that Middle Western coal will not stand the loading and unloading because of breakage and expensive degradation. But the rail men predict confidently that a victory for the dock contention merely means new competition for them to combat.

Anthracite Production Down 50 Per Cent; Fewer Workers and Workdays Reported

Pennsylvania's anthracite mines last year produced but 40,134,561 tons of coal, or slightly less than one-half of the total amount turned out by the mines in 1921. The decline in output was due to the strike of mine workers, lasting five months. The figures on the anthracite industry were completed last week by the bureau of statistics and information of the Pennsylvania Department of Internal Affairs.

These figures show that the anthracite produced last year in the ten counties where it is mined had a value of \$232,765,500 at the mines, while in 1921 the value of the coal at the mines was \$481,261,100. Last year the mines worked on an average of 143 days while in 1921 the average number of days worked reached 217. There were 140,353 employees last year, as compared with 166,831 in the preceding year. Of the total employees last year, 68,162 were Americans white, 174 were Americans colored and 72,017 were foreigners. The mine workers were paid last year a total wage of \$140,111,600. The total payroll in 1921 was \$283,968,700. The capital invested in the operations last year amounted to \$339,495,800. Of the total value of the coal produced in 1922, coal valued at \$173,313,200 was shipped outside of Pennsylvania. During last year 29,692,602 tons of anthracite was shipped out of the state. In 1921 the value of the coal shipped outside of the state was \$390,829,000.

These figures afford some interesting deductions. On the basis of the state's report it appears that:

For every ton of coal the labor cost (wage bill) was \$3.49.

Out of every dollar received for coal (value at the mine) 60.2c. was paid out for wages.

Average daily wages for mine workers, all classes, was \$6.98.

Average annual earnings—in a year which included a strike of 164 days—were \$998.

After paying wages the operators had remaining from coal revenue a sum equivalent to but 27.29 per cent of the investment reported by the state, out of which margin all expenses for supplies, management and superintendence, taxes of all sorts, sales and interest had to be met.

Luzerne County led the other anthracite counties of the state last year with a production of 14,776,698 tons valued at \$91,917,700. Schuylkill County stood second with a tonnage of 11,405,669 valued at \$60,555,200.

The average days the mines were in operation, number of employees, total wages and the value of the production last year by counties follows:

Counties	Average Days in Operation	Average No. of Employees	Total Wages	Value of Production
Carbon.....	160	5,177	\$5,757,600	\$8,591,300
Columbia.....	134	1,463	1,243,900	2,849,300
Dauphin.....	180	1,790	1,916,700	2,642,400
Lackawanna.....	146	25,437	24,794,400	41,690,000
Luzerne.....	134	53,164	51,488,100	91,917,700
Northumberland.....	146	13,606	14,478,300	20,421,500
Schuylkill.....	151	37,173	38,078,000	60,555,200
Sullivan.....	151	754	548,000	1,034,200
Susquehanna.....	179	996	984,600	1,392,800
Wayne.....	143	793	822,000	1,671,100

Burns Bros. Merger Plan Ready

M. F. Burns, president of Burns Brothers, made public on May 23 the complete plan for the recapitalization of Burns Brothers and the agreement of the merger of the properties with the National Coal Corporation, in a letter to stockholders calling a special meeting for June 14 to vote approval of the proposal.

Under the plan only two classes of stock of the new company will be outstanding, against four classes now outstanding. Of the present outstanding stock both classes of preferred will be retired and the Class A and B common stocks will be exchanged for 8 per cent cumulative preferred and common stock of the new company.

The proposed conditions of the merger in respect of exchange of stock are as follows:

(a) The new company will pay to the holders of the prior preference stock of Burns Bros. \$120 per share and all cumulative and unpaid dividends thereon and an amount equal to a dividend at the rate of 7 per cent per annum from the last dividend date to the date set for the surrender thereof in a notice to be given as provided in the agreement of merger.

(b) The new company will pay to the holders of the preferred stock of Burns Bros. \$110 per share and all cumulative and unpaid dividends thereon and an amount equal to a dividend at the rate of 7 per cent per annum from the last dividend date to the date set for the surrender thereof in a notice to be given as provided in the agreement of merger.

(c) The holders of the Class A common stock of Burns Bros. will receive in exchange for each share of such stock one share of 8 per cent cumulative preferred stock of the new company of a par value of \$100 and one share of the common stock of the new company.

(d) The holders of the Class B common stock of Burns Bros. will receive in exchange for each share of such common stock one share of the common stock of the new company.

The capitalization of the new company will consist of \$10,000,000 par value preferred stock and 500,000 shares of common stock. Of the common stock 25,000 shares have been issued at a nominal price to managers of the company and parties interested in the underwriting of the new stocks, and will remain outstanding.

Mr. Burns, in his letter, further points out that "The agreement of merger requires the National Coal Corporation to provide the funds necessary to pay off the present prior preference and preferred stocks of Burns Brothers and it is contemplated that to accomplish this the National Coal Corporation will issue for cash shares of its common stock substantially equivalent in amount to the aggregate shares to be issued in exchange for the outstanding Class A and Class B stock of this company. There will be submitted to the meeting detailed information relative to financial arrangements and relative rights which may be offered to stockholders to subscribe for the new common stock."

Coal Retailers to Hear Talks by Wadleigh, Cushing, Bryden and Parker

F. R. Wadleigh, Federal Fuel Administrator; George H. Cushing, editor of *Cushing's Survey*; J. C. Bryden, chairman of the Special Committee Bituminous Operators, and E. W. Parker are among those who will address the sixth annual convention of the National Retail Coal Merchants' Association, which will be held at Scranton on June 25, 26 and 27.

At the first session on Monday morning reports from the various officers, including Homer D. Jones, the president, will be read, as well as the report of the Reorganization Committee, of which Wellington Bertolet is chairman. Walker Cottrell, of Richmond, Va., is to be the toastmaster at the luncheon at which John H. Durkin, Mayor of Scranton, is to speak. Mr. Wadleigh and Mr. Cushing are to address the members of the association at the afternoon session on Monday.

The association banquet is to be held that evening, with President Jones presiding.

At Tuesday morning's session various committee reports are to be presented and at the luncheon to follow Mr. Bryden is to make his address. The election of officers at the afternoon session is to be followed by an address by Mr. Parker on "Mining and Preparation of Anthracite."

The anthracite operators will entertain the delegates to the convention at dinner Tuesday evening. Wednesday will be devoted to an inspection of the mines.

"Mining Superincumbent Beds," a Topic At Anthracite Section, A.I.M.E.

Called together to give and hear evidence on the effect which the extraction of a lower bed will have on one above it, the Anthracite Section of the American Institute of Mining and Metallurgical Engineers met at the Westmoreland Club, Wilkes-Barre, Pa., Saturday, May 26, the technical discussion being preceded by a dinner at which an election was held for the new officers of the section. E. P. Mathewson, president of the A.I.M.E., and Jack Armour, of *Coal Age*, made the only addresses.

At the close of the banquet Mr. Norris briefly reviewed the paper presented at the February session of the A.I.M.E., by H. R. Eavenson as to certain experiences in the mining of superincumbent seams in the bituminous regions, and Douglas Bunting gave a record of his observations in the mines of the Morris Run Coal Co., in the Blossburg region, where, by the way, the coal is not anthracite but contains 21 per cent of volatile matter. In those mines the Bloss bed had been almost entirely removed, though the exact percentage of recovery was somewhat in doubt. Roughly 50 ft. above was the Morgan bed, separated by an interval of hard sandstone except for a thin bed of fireclay under the Morgan bed, with a thin bed of cannelly coal under that. The Morgan bed was worked with pairs of gob headings 20 ft. wide and with 50-ft. centers. The rooms were driven 42 ft. wide.

The first extraction figured about 62½ per cent and the second about 25 per cent, but figuring in clay veins, which were not infrequent, the actual percentage of recovery of merchantable coal probably reached 92 per cent. The roof above the Morgan bed, between that bed and the Seymour, consisted of 45 to 75 ft. of solid sandstone. In many places the Morgan bed and the rock below it had sheared so that

both had been lowered as much as 15 in. The upper sandstone, being thick and strong, had not partaken in that movement. In consequence an opening of varying depth up to 15 in. was left above the coal in the Morgan seam. Such areas were in places quite large.

The testimony of several engineers showed that vacuities of this kind caused by shear were not uncommon in the anthracite region, and the question arose whether it was desirable to have a roof which would afford such resistance, and thus make such vacuities possible, F. E. Zerbey holding that it was undesirable and Mr. Bunting declaring that it was. Several speakers declared that they were mining coal above seams where the coal had been second-mined and also above seams that had been squeezed shut, as over the scene of the Twin Shaft disaster.

The recovery under these circumstances was quite successful. Caving did not create the disturbance frequently charged to it even when the coal excavated was 30 ft. thick. It should be stated, however, that where the greater thickness was found the coal usually was under heavy pitch. The roof disturbance, however, frequently added to the cost of mining by reason of the introduction of false synclines and anticlines, which complicated the already troublesome coal contours.

Visitors from New York in addition to the aforementioned were Sidney Jennings, former president of the Institute, Dr. F. F. Sharpless, secretary, and R. D. Hall.

Engineers Adopt Program in Storage Study

A definite program for the conduct of an intensive study of certain phases of coal storage was laid down at a meeting in Washington on May 25 of the coal-storage committee of the Federated American Engineering Societies. This committee decided to determine to the best of its ability "the engineering, chemical and economic factors" involved in the storage of coal, and the influence of those factors on storage at the mine and by various classes of consumers. The study has been co-ordinated with those being made on the same subject by the President's Coal Commission and by the Federal Fuel Distributor.

Adopt Price Schedule for Settlement of Accounts of Tidewater Coal Exchange

A schedule of prices to be used as a basis for closing out the debit and credit tonnage accounts of the Tidewater Coal Exchange, Inc., now in the hands of receivers, was adopted at a meeting of the debtors and creditors of the exchange and is now being used in settling accounts.

In presenting the proposed schedule of prices the receivers, Charles A. Owen, Howard Adams and James E. Manter, stated that the Chancery Court of Delaware had held that the title to the property involved in the tonnages of the pools of the exchange was and is in the tonnage credit members of each of said pools, and that the Court had directed the debits and credits to be completely settled on the basis of each pool. The receivers stated that it was impracticable to make such settlement because in nearly every pool tonnage debtors were involved who are in the hands of receivers or out of business; therefore it would be necessary for the debtors and creditors to agree among themselves on a method of settlement.

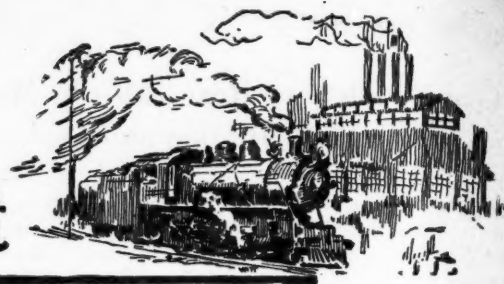
The schedule of prices adopted by the meeting is based on gross tons and covering the period from May 1, 1920, to Sept. 30, 1921, follows:

SCHEDULE OF PRICES PER GROSS TON, F.O.B. MINES

Pool.....	1	4	9-71	10-12	11-15	14	18	21-34 40-54 64	30-37	31-38	33-39 53-63	43	44	60	61
Month	RM	RM	RM	RM	RM	RM	RM	RM	LUMP	RM	LUMP	LUMP	RM	LUMP	RM
May 1 to Sept. 30, 1920....	\$11.50	\$10.80	\$11.50	\$10.50	\$10.25	\$10.50	\$10.00	\$10.00	\$11.15	\$10.65	\$10.50	\$10.00	\$9.80	\$11.40	\$10.90
Oct., 1920.....	11.25	10.80	11.00	10.50	10.25	10.50	10.00	10.00	11.15	10.65	10.50	10.00	9.80	11.40	10.90
Nov., 1920.....	7.60	7.15	7.40	7.00	6.70	6.85	6.45	6.75	7.25	7.00	7.00	6.75	6.50	7.50	7.25
Dec., 1920.....	6.25	5.30	5.70	5.05	4.75	4.90	4.40	4.75	5.85	5.60	5.00	4.75	4.50	6.10	5.85
Jan., 1921.....	4.50	3.50	4.10	3.35	3.10	3.25	2.60	3.10	4.15	3.90	3.35	3.10	2.95	4.35	4.10
Feb., 1921.....	4.15	3.15	3.40	2.90	2.50	2.70	2.00	2.50	3.75	3.50	2.75	2.50	2.35	3.95	3.70
March, 1921.....	3.85	2.95	3.25	2.80	2.35	2.60	1.80	2.35	3.50	3.25	2.60	2.35	2.20	3.65	3.40
April, 1921.....	3.85	2.85	3.15	2.75	2.25	2.50	1.60	2.25	3.25	3.00	2.50	2.25	2.10	3.30	3.15
May, 1921.....	3.75	2.80	3.10	2.70	2.25	2.45	1.60	2.00	3.00	2.75	2.25	2.00	1.85	3.20	2.95
June 1 to Sept. 30, 1921....	3.70	2.50	2.90	2.45	2.05	2.30	1.60	1.80	2.75	2.50	2.05	1.80	1.65	2.95	2.70



Production and the Market



Weekly Review

The country's business is crossing an economic tableland. It is not going downgrade. Well-advised opinion is that the country is fortunate in having relief from the rapid ascent of February and March. The great volume of buying power produced by the unprecedented amounts being distributed in wages is a real element of stability. There is full employment, no stocks and no overproduction. None of the elements of depression is present in the existing situation.

Coal, both hard and soft, is responding to the steady demand with large outputs. Of anthracite there is not sufficient production even at such an unprecedented level for this time of year as over 2,000,000 net tons per week. Prices hold firm and independents are taking premiums over company circulars. Bituminous coal, on the other hand, is capable of such large output that no difficulty is experienced in getting supplies. The better coals are offered in ample amounts to meet the demand of discriminating buyers, and the lower grades are hard to move. Inquiries are plentiful for industry and the railroads are buying. Spot prices are below contract prices and are dropping slowly and steadily.

APRIL OUTPUT 9 PER CENT LESS THAN MARCH

Soft-coal output for the first 119 working days of 1923 was slightly ahead of the corresponding period for the active years of 1917, 1918 and 1920, and nearly one-third ahead of that period of the years of depression, 1919, 1921 and 1922. Output in April was 42,564,000 net tons, a decrease of 9 per cent compared with March.

Stocks of anthracite in the hands of producers on April 30, as reported by the Department of Commerce, were 182,000 tons, compared with 161,000 tons March 31. There were 2,775,000 tons in stock on April 30, 1922.

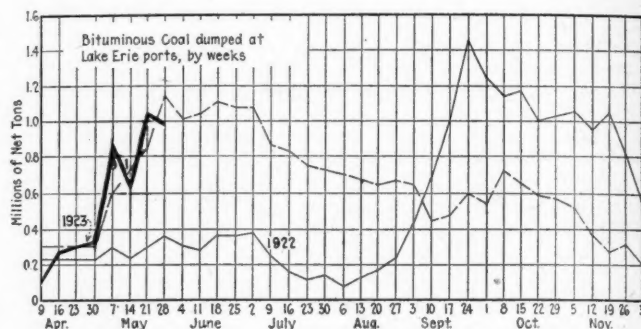
Declines in prices occurred in the Pocahontas, Clearfield, Cambria, Somerset and western Kentucky districts, with advances in Pittsburgh, Kanawha and

eastern Kentucky. Coal Age Index of spot prices of bituminous coal registered 217 on May 28, a loss of four points in a week. The average price was \$2.63.

Business is dull in the Middle West. Large consumers are picking up distress coals but have not yet started to stock. Consumers in New England who last year used Southern coals have placed orders for good-sized tonnages of Pool 9 and 10 grades of Pennsylvania coals because of lower prices on all-rail coal.

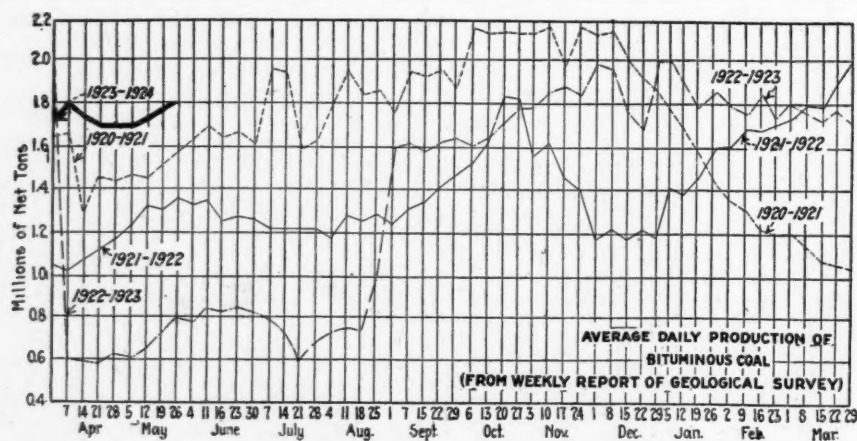
The export market is quiet. Baltimore custom returns show that during the first 24 days of May 26 of the 34 steamers leaving that port took 18,801 tons of bunkers and that 236,129 tons of cargo coal was dumped.

More strength is shown in the Lake trade. Dumpings



are increasing. It is estimated there is at least 1,000,000 tons of coal at the Head-of-the-Lakes. Anthracite is going forward in good volume, although Buffalo shipments from the beginning of the season to May 22 inclusive were 238,680 tons less than in the corresponding period in 1921, when they amounted to 687,600 tons.

"Preliminary estimates of production of soft coal during the week ended May 19 indicate an increase to 10,293,000 net tons, a gain of 118,000 over the revised estimate for the week preceding," says the Geological Survey. "Thus for two weeks an upward tendency in production is shown. This tendency is further shown



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
May 5.....	4,164,000	10,061,000
May 12 (b).....	4,433,000	10,175,000
May 19 (a).....	4,481,000	10,293,000
Daily average.....	747,000	1,716,000
Calendar year.....	157,607,000	210,025,000
Daily av. cal. year.....	1,330,000	1,769,000

ANTHRACITE

	1922	1923
May 5.....	6,000	2,021,000
May 12.....	7,000	1,903,000
May 19.....	8,000	2,045,000
Calendar year.....	21,824,000	39,563,000

COKE

	1922	1923
May 12 (b).....	97,000	317,000
May 19 (a).....	72,000	332,000
Calendar year.....	2,593,000	7,634,000

(a) Subject to revision. (b) Revised from last report.

by early returns on car loadings during the week May 21-26, which forecast an increase of 5 to 8 per cent over last week, or a total of 10,700,000 to 11,000,000 tons."

Hampton Roads dumpings for all accounts were 361,434 net tons during the week ended May 24, as compared with 333,977 tons in the previous week.

Domestic sizes of anthracite continue to be rapidly absorbed, with the trade asking for larger shipments. Companies and independent operators are well sold up, considerable coal going into the Northwest and Canada. With few exceptions retail dealers have not yet started to stock up.

No New Business in Midwest

Dullness prevails throughout the markets of the Middle West just as it has prevailed for a month. There is less distress coal now than for two or three weeks because nobody is trying to push anything. Southern Illinois screenings have firmed up a shade as a result and are uniformly bringing \$1.75, with few undercuts. There remain a good many no-bills in parts of the southern Illinois field, however, and

domestic coal is still weak at the circular price of \$4.10. A good deal of it brings \$3.50. Little other coal is moving. Demand is picking up slightly for smokeless and anthracite without price changes in those fuels.

The countrywide stocking program that was expected to save the situation at this season of the year has not developed in the Middle West. Two or three railroads whose finances are firmest are buying steadily, but that is the only relieving sign.

The fields of central Illinois, Mt. Olive, Standard district and in the Du Quoin region are doing little. Two days running time a week is the best that any operating mine can do on open-market business and few of them are operating at all except to make contract deliveries. Du Quoin domestic sizes do well to bring \$3.25. Mt. Olive lump hardly attains that height. The Wabash R.R. is storing a little Mt. Olive in piles along its line through that field.

Little Doing in St. Louis

A few apartment-house owners in St. Louis are taking a little Standard 2-in. lump at \$2@2.25 for summer storage. This plus a light demand for anthracite, smokeless and coke is all the business there is. City steam trade is slack and the country takes no steam fuel at all. Tonnage for thresh-

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	May 29 1922	May 14 1923	May 21 1923	May 28 1923†
Smokeless lump.....	Columbus	\$3.55	\$6.25	\$6.25	\$6.00@ \$6.50
Smokeless mine run.....	Columbus	3.40	4.10	4.05	4.00@ 4.30
Smokeless screenings.....	Columbus...	3.25	3.75	3.70	3.35@ 3.85
Smokeless lump.....	Chicago	3.40	6.10	6.10	6.00@ 6.25
Smokeless mine run.....	Chicago...	3.15	3.85	4.10	4.00@ 4.25
Smokeless lump.....	Cincinnati...	3.40	6.00	6.25	6.00@ 6.50
Smokeless mine run.....	Cincinnati...	3.15	4.25	4.25	4.00@ 4.50
Smokeless screenings.....	Cincinnati...	3.00	4.10	4.25	4.00@ 4.50
*Smokeless mine run.....	Boston...	6.15	6.85	6.85	6.25@ 6.60
Clearfield mine run.....	Boston...	3.15	2.75	2.60	2.00@ 2.75
Cambria mine run.....	Boston...	3.65	3.60	3.25	2.60@ 3.50
Somerset mine run.....	Boston...	3.40	3.10	3.00	2.25@ 3.00
Pool 1 (Navy Standard)...	New York...	...	3.75	3.75	3.50@ 4.00
Pool 2 (Navy Standard)...	Philadelphia...	...	4.00	3.80	3.55@ 4.00
Pool 1 (Navy Standard)...	Baltimore...	...	...	...	...
Pool 9 (Super. Low Vol.)...	New York...	3.80	2.90	2.90	2.55@ 3.25
Pool 9 (Super. Low Vol.)...	Philadelphia...	3.60	3.00	2.85	2.55@ 3.20
Pool 9 (Super. Low Vol.)...	Baltimore...	3.25	2.75	2.75	2.60@ 2.80
Pool 10 (H.Gr. Low Vol.)...	New York...	3.60	2.50	2.50	2.80@ 2.75
Pool 10 (H.Gr. Low Vol.)...	Philadelphia...	3.25	2.40	2.35	2.15@ 2.55
Pool 10 (H.Gr. Low Vol.)...	Baltimore...	3.25	2.25	2.30	2.15
Pool 11 (Low Vol.).....	New York...	3.25	2.20	2.05	1.85@ 2.30
Pool 11 (Low Vol.).....	Philadelphia...	2.75	2.00	2.05	1.80@ 2.25
Pool 11 (Low Vol.).....	Baltimore...	3.05	2.00	2.00	1.90@ 2.00
High-Volatile, Eastern	Market Quoted	May 29 1922	May 14 1923	May 21 1923	May 28 1923†
Pool 54-64 (Gas and St.)...	New York...	3.10	1.85	1.85	1.75@ 2.25
Pool 54-64 (Gas and St.)...	Philadelphia...	2.75	1.85	2.05	2.00@ 2.15
Pool 54-64 (Gas and St.)...	Baltimore...	3.00	1.80	1.80	1.75
Pittsburgh sec'd gas.....	Pittsburgh...	...	2.85	2.85	2.75@ 3.00
Pittsburgh mine run (St.)...	Pittsburgh...	...	2.00	2.00	2.15@ 2.35
Pittsburgh slack (Gas)...	Pittsburgh...	...	1.75	1.85	1.60@ 1.75
Kanawha lump.....	Columbus...	3.45	3.25	3.25	2.60@ 3.00
Kanawha mine run.....	Columbus...	3.25	2.20	2.20	1.90@ 2.20
Kanawha screenings.....	Columbus...	3.10	1.75	1.75	1.60@ 1.90
W. Va. lump.....	Cincinnati...	3.40	3.75	3.10	3.50@ 4.50
W. Va. Gas mine run.....	Cincinnati...	3.30	2.20	1.80	1.75@ 2.00
W. Va. Steam mine run.....	Cincinnati...	3.10	2.20	1.80	1.75@ 2.00
W. Va. screenings.....	Cincinnati...	3.10	2.00	1.65	1.55@ 1.85
Hooking lump.....	Columbus...	3.60	2.80	2.75	2.35@ 2.75
Hooking mine run.....	Columbus...	3.55	1.95	1.95	1.75@ 2.10
Hooking screenings.....	Columbus...	3.55	1.60	1.45	1.25@ 1.60
Pitts. No. 8 lump.....	Cleveland...	...	2.90	2.95	2.40@ 3.50
Midwest	Market Quoted	May 29 1922	May 14 1923	May 21 1923	May 28 1923†
Pitts. No. 8 mine run....	Cleveland...	\$3.25	\$2.15	\$2.15	\$2.10@ \$2.80
Pitts. No. 8 screenings...	Cleveland...	3.25	1.60	1.65	1.40@ 1.60
Franklin, Ill. lump.....	Chicago...	...	3.80	3.80	3.50@ 4.10
Franklin, Ill. mine run....	Chicago...	...	3.10	3.10	3.00@ 3.25
Franklin, Ill. screenings...	Chicago...	...	1.75	1.80	1.75@ 1.90
Central, Ill. lump.....	Chicago...	...	2.30	2.60	2.50@ 2.75
Central, Ill. mine run....	Chicago...	...	2.10	2.10	2.00@ 2.25
Central, Ill. screenings...	Chicago...	...	1.85	1.85	1.75@ 2.00
Ind. 4th Vein lump.....	Chicago...	...	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run....	Chicago...	...	2.85	2.85	2.75@ 3.00
Ind. 4th Vein screenings...	Chicago...	...	1.85	1.85	1.75@ 2.00
Ind. 5th Vein lump.....	Chicago...	...	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run....	Chicago...	...	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings...	Chicago...	...	1.65	1.55	1.50@ 1.65
Standard lump.....	St. Louis...	...	2.60	2.25	2.00@ 2.50
Standard mine run.....	St. Louis...	...	1.80	1.80	1.75@ 1.90
Standard screenings.....	St. Louis...	...	1.50	1.50	1.50
West Ky. lump.....	Louisville...	3.20	2.60	2.60	2.10@ 2.60
West Ky. mine run.....	Louisville...	3.20	1.90	1.90	1.75@ 1.85
West Ky. screenings.....	Louisville...	3.20	1.60	1.60	1.25@ 1.60
West Ky. lump.....	Chicago...	3.10	2.60	2.60	2.25@ 2.60
West Ky. mine run.....	Chicago...	3.10	1.80	1.80	1.25@ 1.60
South and Southwest	Market Quoted	May 29 1922	May 14 1923	May 21 1923	May 28 1923†
Big Seam lump.....	Birmingham...	2.00	2.70	2.70	2.70
Big Seam mine run.....	Birmingham...	1.70	2.05	2.05	1.85@ 2.25
Big Seam (washed).....	Birmingham...	1.85	2.35	2.35	2.25@ 2.50
S. E. Ky. lump.....	Chicago...	3.10	3.75	3.75	3.50@ 4.00
S. E. Ky. mine run.....	Chicago...	3.10	2.85	2.35	2.25@ 2.50
S. E. Ky. lump.....	Louisville...	3.10	4.00	3.75	3.50@ 4.00
S. E. Ky. mine run.....	Louisville...	3.10	2.50	2.50	2.00@ 2.50
S. E. Ky. screenings.....	Louisville...	3.10	1.90	1.90	1.60@ 1.80
S. E. Ky. lump.....	Cincinnati...	3.30	3.35	3.35	3.50@ 4.00
S. E. Ky. mine run.....	Cincinnati...	3.15	2.00	1.80	1.65@ 2.00
S. E. Ky. screenings.....	Cincinnati...	3.15	1.80	1.60	1.25@ 1.85
Kansas lump.....	Kansas City...	4.25	3.85	3.85	3.25@ 4.50
Kansas mine run.....	Kansas City...	4.20	3.25	3.25	3.00@ 3.50
Kansas screenings.....	Kansas City...	2.75	2.60	2.60	2.50@ 2.75

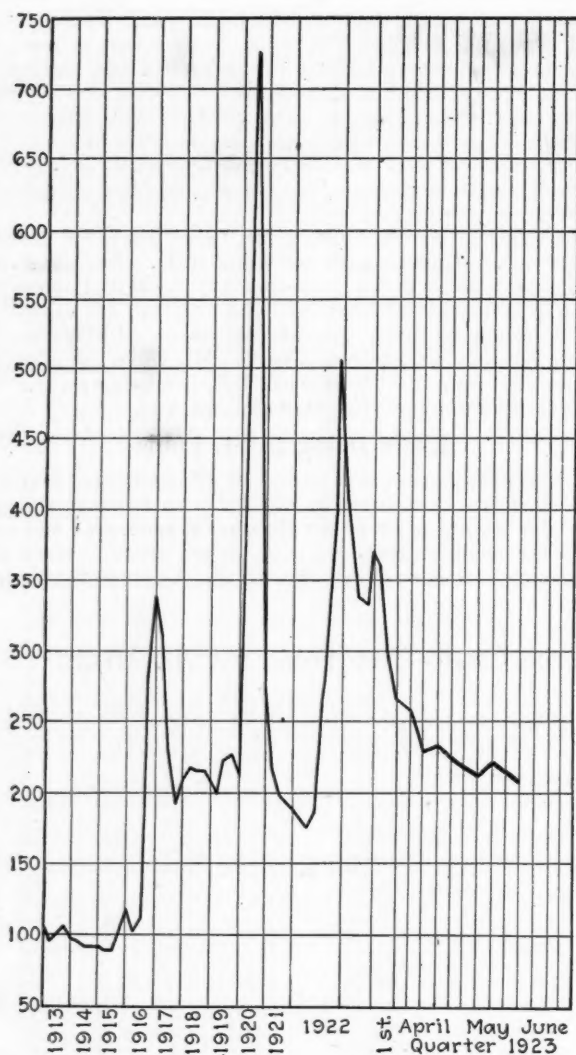
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Pre-Strike Company	May 21, 1923 Independent	May 21, 1923 Company	May 28, 1923† Independent	May 28, 1923† Company
Broken.....	New York	\$2.34		\$7.60@ \$7.75		\$7.75@ \$8.35		\$7.75@ \$8.35
Broken.....	Philadelphia	2.39	\$7.00@ \$7.50	7.75@ 7.85		7.90@ 8.10		7.90@ 8.10
Egg.....	New York	2.34	7.60@ 7.75	7.60@ 7.85	\$8.50@ 11.00	8.00@ 8.35	\$8.50@ 11.00	8.00@ 8.35
Egg.....	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@ 9.50	8.10@ 8.35	9.25@ 9.50	8.10@ 8.35
Egg.....	Chicago*	5.09	7.50	8.25	12.00@ 12.50	7.20@ 8.25	12.00@ 12.50	7.20@ 8.25
Stove.....	New York	2.34	7.90@ 8.20	7.90@ 8.10	8.50@ 11.00	8.00@ 8.35	8.50@ 11.00	8.00@ 8.35
Stove.....	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Stove.....	Chicago*	5.09	7.75	8.25	12.00@ 12.50	7.35@ 8.25	12.00@ 12.50	7.35@ 8.25
Chestnut.....	New York	2.34	7.90@ 8.20	7.90@ 8.20	8.50@ 11.00	8.00@ 8.35	8.50@ 11.00	8.00@ 8.35
Chestnut.....	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Chestnut.....	Chicago*	5.09	7.75	8.25	12.00@ 12.50	7.35@ 8.35	12.00@ 12.50	7.35@ 8.35
Ranges.....	New York	2.34				8.30		8.30
Pea.....	New York	2.22	5.00@ 5.75	5.75@ 6.45	6.30@ 7.25	6.00@ 6.30	6.30@ 7.50	6.00@ 6.30
Pea.....	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.25	6.15@ 6.20	7.00@ 7.25	6.15@ 6.20
Pea.....	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1.....	New York	2.22	2.75@ 3.00	3.50	2.25@ 3.50	3.50@ 4.15	2.75@ 3.50	3.50@ 4.15
Buckwheat No. 1.....	Philadelphia	2.14	2.75@ 3.25	3.50	3.00@ 3.50	3.50	2.75@ 3.50	3.50
Rice.....	New York	2.22	2.00@ 2.50	2.50	1.50@ 2.50	2.50	2.25@ 2.50	2.50
Rice.....	Philadelphia	2.14	2.00@ 2.50	2.50	2.00@ 2.50	2.50	1.75@ 2.50	2.50
Barley.....	New York	2.22	1.50@ 1.85	1.50	1.00@ 1.50	1.50	1.00@ 1.50	1.50
Barley.....	Philadelphia	2.14	1.50@ 1.75	1.50	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye.....	New York	2.22		2.00@ 2.50		1.60		1.60

* Net tons, f.o.b. mines † Advances over previous week shown in heavy type, declines in italics.



Coal Age Index 217, Week of May 28, 1923. Average spot price for same period \$2.63. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

ing this year has dropped to about one-fifth of what might be called normal. Oil and gasoline appear to have beaten coal to this market.

Kentucky Looks Forward a Month

The general demand on western Kentucky mines is slow. Few mines report better than an average of two days a week except a few with contracts. Operators are beginning to see the futility of overloading trackage with unbilled coal, which merely weakens the market. Screenings are weaker in price despite the fact that there isn't much demand for lump or block. However, there is a fair demand for nut sizes for summer stove use. Indications are that screenings may stiffen somewhat when lump demand shows further softness and when steam plants shift to screenings after Lake trade on larger sizes increases the volume of fine coal on the market.

The feeling is that with lump coal selling at \$3 and up and screenings at probably around \$1.25 a ton, mine-run will meet with little demand.

Northwest Docks Are Getting Business

The price-cutting campaign to regain markets lost to Illinois and Indiana rail shippers is said to be winning business throughout the southern part of Minnesota and in North Dakota. However, the margin of profits for both

sides has practically disappeared, and the volume of trade is not heavy because dealers still think the war between the docks and the rail men will bring further advantage to them.

There is a good call from industrial concerns and the iron ranges. These consumers seem to be satisfied with the present levels, and it is to them and to the railroads that much of the shipping is being done. Prices at Duluth remain about the same, the following quotations being for lump, run of pile and screenings: Youghiogeny, \$7, \$6 and \$4.50; Hocking, \$6.75, \$5.75 and \$4.25; splint \$7.50, \$6.50 and \$4.50; Kentucky lump, \$8 to \$9.50. Pocahontas has dropped off from the \$12.50 level to \$11, \$7.50 and \$6.75.

At Milwaukee receipts have been heavy but trade is dull. Unseasonably cold weather keeps up a suggestion of domestic and heating business and a little anthracite is moving off the docks to inland dealers all the time.

West Buys Little Coal

Light buying still prevails throughout the West. Kansas City and Oklahoma sales offices feel a slight call for threshing coal from the southern end of the wheat belt. A very small storage movement is going on, which includes semi-anthracite, the price on which is slated to go up 50c. at once. Other quotations remain unchanged.

In Colorado heavy rains and chilly weather have kept up a small domestic and heating trade, which holds the market fairly steady. Mines average not over three days a week. There have been no circular changes during the week. Clearing of the blockade in Tunnel 50 on the Moffatt road has opened up the outlet from Routt County.

The only thing that keeps Utah business going is raw spring weather. Domestic consumers are doing no storing in spite of the summer reductions. Mines are averaging about two days a week.

Conditions in Ohio Vary

Trade at Columbus continues quiet and draggy. Buying is limited to immediate wants. Renewal of contracts is not active, as many consumers are buying at low prices when distress coal is available. Pocahontas and smokeless grades are the strongest features of the domestic trade, as well as West Virginia splints and Kentucky coals. For the past few days there has been a better tone to the Cincinnati market than for sometime. Steel buyers are again in the market. Better buying for the lake trade resulted in better prices for 2-in. lump, most of it being held \$3@3.50. At Cleveland the demand is fair. Industrial steam consumers are obtaining their requirements in the open market, and retail buying is quiet.

The Pittsburgh gas-coal market shows no material change. Mine-run is not moving to any great extent, while gas slack commands little if any premium over steam slack on account of heavy offerings. A slight improvement is noted in central Pennsylvania in spite of low prices, many orders from New England being reported. During the week ended May 20 there were 16,970 cars loaded, as compared with 16,300 cars the previous week.

Buffalo consumers are buying slowly and at low prices and are not adding to their reserve stocks.

Railroad buying is believed to be responsible for slightly better conditions in southern West Virginia high-volatile fields. Transportation conditions are better in northern and southern West Virginia and mines on the Norfolk & Western are increasing their production. Inquiries from the tidewater market are largely confined to gas coals.

New England Buys Only Quality Coals

While there has been restricted buying the past week on the part of certain manufacturers in New England, the purchases have been almost exclusively of the better grades from central Pennsylvania. A few of the quality coals are sold up now for June, and the next move will be higher quotations both for delivery extended over several months and for July and August. As yet the medium coals have not been affected; car distribution during June will have some bearing on quotations, however, and the trade is much interested to see when the turn will come.

Meanwhile the Hampton Roads coals have eased off

materially in price. Efforts to curtail the volume of coal for the Virginia terminals have not succeeded, and once more there are accumulations and widespread solicitation for spot orders. No. 1 grades are quoted at \$6.50, with seconds at \$6 @ \$6.25, and only light inquiry. Export demand is by no means staple, and the \$7 level the agencies tried to hold cost them a considerable tonnage which has already begun to move from central Pennsylvania via Philadelphia. For distribution inland there is also very little demand. The \$8 price on cars Boston is still high enough to drive business toward the all-rail route among buyers who are not wedded to the Southern coals, and more than likely the rehandlers at this end will soon modify their quotation to correspond with receding figures at Hampton Roads.

Embargoes that were in effect against destinations on the New Haven and on the Boston & Maine during much of May have now been raised, and receipts at the Hudson River gateways will soon show a material increase. The trade is not much encouraged, however, for it is realized that transportation disabilities are more deep-seated that can be cured by any temporary expedient.

New York Market Notes Improvement

There was an improvement noticed in the New York market. Buyers continue to make inquiries and the better grades of coal were well sold up. At the piers 2,297 cars were reported on May 25, a considerable decrease from the previous week. Some sales of distress coal at low prices were made. There has been no tendency on the part of Philadelphia consumers to stock up, but there are reports that they will start about July 1. The export situation continues to interest the Baltimore market. In Birmingham, Ala., the spot market is quiet. Bunkering was somewhat better, some trans-Atlantic boats taking on coal for the return voyage.

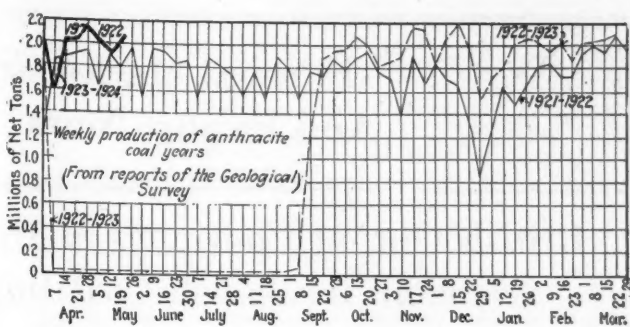
Lake Loading Shows Activity

Loading of boats is going on actively, aided considerably by improved car supply at Cleveland. On May 24 the railroads had 15,624 cars at the lower lake docks and 5,000 cars in transit. In the Pittsburgh market sales in the lake trade were heavier. Some producers in the southern Ohio field have small lake contracts. Lake dumpings for the week ended May 28 were 884,538 net tons of cargo coal and 45,661 net tons of fuel coal, making the dumpings for the season 4,248,601 net tons of cargo coal and 186,010 net tons of fuel coal.

Domestic Anthracite Moving Heavily

Heavy shipments of domestic sizes of anthracite are going into the Northwest, Canada and New England. In the East deliveries are insufficient to enable retail dealers to begin stocking. Stove coal is the hardest of the domestic sizes to be obtained but there has been no let-up in the call for the other coals. Steam sizes are slowly moved. During the week ended May 19 the American Railway Association reports that 3,159 cars of anthracite passed through the principal gateways over the Hudson River into New England.

A legislative committee of Massachusetts called upon the Boston & Maine management to exempt domestic sizes from temporary embargoes, in view of the great pressure to get



supplies forward. Cancellation of the embargo had at that time already been determined upon however.

Movement via the New York and Philadelphia piers continues in reasonably good volume, especially at Port Richmond. Practically all the tonnage of the Philadelphia & Reading Ry. fleet is now in operation, and the quantity of coal dumped will compare favorably with years like 1921 and 1922.

"Production of anthracite in the week ended May 19 increased 7.5 per cent over the production in the week preceding," says the Geological Survey. "The nine principal carriers of anthracite reported loading 39,106 cars, from which it is estimated that the total output, including mine fuel, local sales, and the product of dredges and washeries, was 2,045,000 net tons.

"Preliminary reports of loadings in the first three days of the week May 21-26 indicate a smaller output, principally on account of the low rate of production on Whit Monday."

Coke Output Increases Slightly

Production of coke for the week ended May 19, says the Geological Survey, shows an estimated output of 409,000 net tons, an increase of 8,000 tons when compared with the previous week. An increase of 25,000 tons in the Pennsylvania-Ohio region more than offset small losses in the southern and middle Appalachian states and in Colorado and New Mexico.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to May 12, 1923 Inclusive	Week Ended May 12, 1923
U. S. Total.....	55.7	55.7	55.7	(a)
Somerset County.....	74.9	36.3	34.0	67.5
Panhandle, W. Va.....	51.3	57.3	56.6	60.4
Westmoreland.....	58.8	65.8	56.5	65.0
Virginia.....	59.9	55.7	57.0	41.6
Harlan.....	54.8	22.1	25.7	31.1
Hazard.....	58.4	16.4	24.3	34.8
Pocahontas.....	60.0	36.6	38.3	35.9
Tug River.....	63.7	28.8	35.9	31.6
Logan.....	61.1	26.2	31.6	49.9
Cumberland-Piedmont.....	50.6	31.7	49.3	38.7
Winding Gulf.....	64.3	30.4	35.8	45.0
Kenova-Thacker.....	54.3	42.4	36.8	40.4
N. E. Kentucky.....	47.7	28.4	29.8	42.7
New River.....	37.9	31.6	37.2	49.3
Oklahoma.....	59.6	59.1	45.3	47.1
Iowa.....	78.4	75.9	72.3	52.4
Ohio, Eastern.....	46.6	40.8	37.2	53.7
Missouri.....	66.8	76.3	70.4	31.5
Illinois.....	54.5	49.9	44.1	45.1
Kansas.....	54.9	55.9	46.0	31.4
Indiana.....	53.8	37.7	48.3	49.9
Pittsburgh†.....	39.8	41.2	38.0	54.3
Central Pennsylvania.....	50.2	53.4	49.1	56.3
Fairmont.....	44.0	35.5	38.6	29.4
Western Kentucky.....	37.7	32.4	32.1	76.0
Pittsburgh*.....	31.9	56.1	62.3	34.5
Kanawha.....	13.0	15.6	24.3	26.0
Ohio, Southern.....	24.3	38.1	30.8	

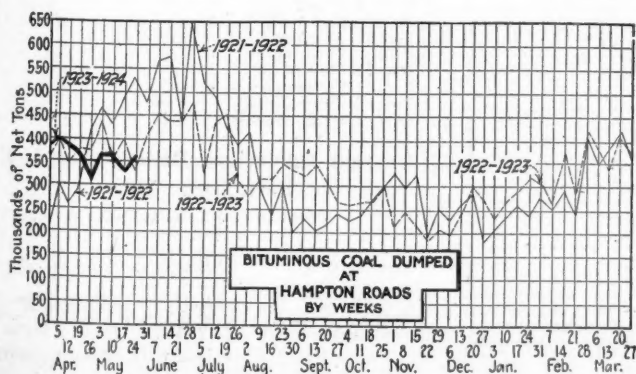
* Rail and river mines combined.

† Rail mines.

(a) No report.

Car Loadings, Surpluses and Shortages

	All Cars	Coal Cars	Car Shortage
Week ended May 12, 1923.....	974,531	175,158	15,653
Previous week.....	961,029	175,866	16,672
Same week in 1922.....	767,094	78,789	
Surplus Cars			
May 14, 1923.....	18,419	2,776	23,761
Same date in 1922.....	343,689	218,466	
May 7, 1923.....	16,081	3,195	28,316



Foreign Market And Export News

British Output Continues at High Mark; Demand for Welsh Coal Improves

British coal production for the week ended May 12 was 5,603,000 tons, says a cable to *Coal Age*. This compares with 5,325,000 tons the previous week and 5,825,000 tons for the week of April 21 last, the post-war record.

Official figures of the British Board of Trade, says the Bankers Trust Co. of New York, shows that during the first three months of 1923 exports of British coal was 18,694,402 tons, which was almost 1,500,000 greater than in the corresponding period of 1913. In March of this year Germany received 1,836,399 tons of British coal and France 1,805,204 tons.

There is an improvement in the demand for Welsh coal and the operators feel confident they will be kept busy throughout the year. Many buyers are anxious to cover their requirements for the balance of the year. Continental demand is heavier in spite of the unsettled conditions in the Ruhr. Output of Welsh coal is now at the rate of 58,000,000 tons a year, as compared with 56,750,000 tons in 1913, while exports from Wales are above the pre-war level.

The north of England market is strong. German, Russian and Scandinavian buyers are pressing the operators, with French and Belgian demands active, while Italy's demands are easier.

Less Activity at Hampton Roads

Business at Hampton Roads last week showed little activity, and prices weakened with a slowing up in the movement of vessels. Supplies of coal continued to depreciate, due to heavy movements by rail to the West.

Export business held its own so far as movement was concerned, but few new orders being received the bulk of the coal moved to foreign ports having been bought last month for May delivery. The bunker trade showed a slight reduction.

Some heavy coastwise movements were recorded, one cargo being consigned to the West Coast by water.

The piers at Hampton Roads operated on an indifferent schedule, but shippers regarded the slight depression as only temporary.

United States April Domestic Coal Exports

Coal:	1922	1923
Anthracite	109,290	421,922
Value	\$1,057,378	\$4,500,531
Bituminous	714,995	1,384,879
Value	\$3,479,041	\$8,674,885
Coke	28,413	201,788
Value	\$243,417	\$2,291,187

Coal:	1922	1923
Anthracite	2,891,241	2,869,307
Value	\$31,262,142	\$31,527,677
Bituminous	12,095,699	11,286,109
Value	\$63,101,455	\$72,220,483
Coke	246,543	737,788
Value	\$2,147,135	\$8,148,865

French Fuel Consumption

Fuel consumption of France during March of this year and for the first quarter of 1923, in metric tons, follows:

Coal	March	First Quarter of 1923
Output	3,012,116	8,638,381
Imports	2,022,687	5,671,951
Exports	5,034,803	14,310,332
Consumption of raw coal	301,974	791,489
	4,732,829	13,518,843

The above figures include raw coal subsequently transformed in coke and briquets.

Coke	March	First Quarter of 1923
Production (from collieries ovens only)	149,285	402,961
Imports	126,924	695,166
Exports	276,209	1,098,127
Consumption of coke	24,439	88,223
Briquets	251,770	1,009,904
Production (from collieries works only)	262,316	780,160
Imports	41,776	203,404
Exports	304,092	983,564
Consumption of briquets	25,191	76,220
	278,901	907,344

Export Clearances, Week Ended May 19, 1923

FROM BALTIMORE

For Canada:	Net Tons
Am. SS. Sudurco, for Canada	511
For France:	
Br. SS. Wearpool, for France	8,689
Nor. SS. Samnanger, for France	6,525
Ital. SS. Tiereno, for France	7,397
Fr. SS. Portiers, for France	6,493
Br. SS. Roxbury, for France	7,500
Br. SS. Strathfillan, for France (Coke)	4,640
Nor. SS. Dagfield, for France (Coke)	6,590
For Germany:	
Jap. SS. Malta Maru, for Germany	8,554
Swed. SS. Araton, for Germany	6,841
For Italy:	
Ital. SS. San Giuseppe, for Italy	7,792
For Sweden:	
Swed. SS. Boden, for Sweden	7,210

FROM PHILADELPHIA

For Belgium:	
Belg. SS. Persier, for Antwerp	
For Cuba:	
Dan. SS. Silkeborg, for Havana	
Dan. SS. Phoenix, for Havana	
For France:	
Br. SS. Lesreaul, for Dunkirk	

FROM HAMPTON ROADS

For Argentina:	
Br. SS. Loyal Devonian, for Campana	4,789
For Brazil:	
Braz. SS. Santarem, for Rio de Janeiro	2,657
Br. SS. Vulcan City, for Rio de Janeiro	6,694
Br. SS. Polycarp, for Para	535
Br. SS. Diadem, for Buenos Aires	6,468
Br. SS. Nile, for Rio de Janeiro	7,708
Ital. SS. Arsa, for Rio de Janeiro	7,495
For Cuba:	
Nor. SS. Wagland, for Havana	3,000
For France:	
Nor. SS. Balto, for Dunkirk	9,817
For Germany:	
Du. SS. Hvidehavet, for Hamburg	4,520
Nor. SS. Hallgyn, for Hamburg	9,382
For Holland:	
Du. SS. Tjibeson, for Rotterdam	13,685
For Italy:	
Ital. SS. Iddeleigh, for Savona	6,131
For West Indies:	
Latvian SS. Katie, for St. Lucia	3,000
Nor. SS. Christian Michelsen, for Fort de France	5,361

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.	May 17	May 24
Cars on hand	1,135	1,037
Tons on hand	71,137	64,333
Tons dumped for week	90,159	102,909
Tonnage waiting	1,700	6,200
Virginia Ry. piers, Sewalls Pt.		
Cars on hand	1,487	1,699
Tons on hand	84,470	95,400
Tons dumped for week	129,109	125,080
Tonnage waiting	14,346	16,118
C. & O. piers, Newport News:		
Cars on hand	1,543	12,052
Tons on hand	90,660	68,135
Tons dumped for week	78,926	94,720
Tonnage waiting	11,695	5,300

Pier and Bunker Prices, Gross Tons

PIERS	May 19	May 26†
Pool 9, New York	\$5.50@5.75	\$5.35@5.75
Pool 10, New York	4.50@ 5.25	4.35@ 5.25
Pool 11, New York	4.00@ 4.50	3.75@ 4.60
Pool 9, Philadelphia	5.90@ 6.35	5.85@ 6.15
Pool 10, Philadelphia	5.00@ 5.55	4.95@ 5.45
Pool 11, Philadelphia	4.10@ 4.55	4.00@ 4.65
Pool 1, Hamp. Roads	7.00	6.75@ 7.00
Pools 5-6-7, Hamp. Rds.	5.25	5.00@ 5.25
Pool 2, Hamp. Roads	6.75	6.50@ 6.75

BUNKERS

Pool 9, New York	5.80@ 6.05	5.65@ 6.05
Pool 10, New York	4.80@ 5.55	4.65@ 5.55
Pool 11, New York	4.30@ 4.80	4.05@ 4.80
Pool 9, Philadelphia	6.15@ 6.35	6.10@ 6.30
Pool 10, Philadelphia	5.15@ 5.95	5.10@ 5.85
Pool 11, Philadelphia	4.30@ 4.90	4.25@ 5.00
Pool 1, Hamp. Roads	7.00	6.75@ 7.00
Pool 2, Hamp. Roads	6.75	6.50@ 6.75

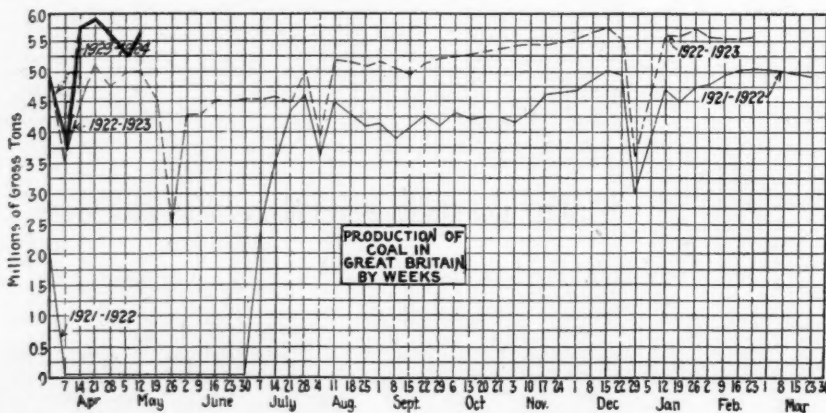
Current Quotations British Coal f.o.b.

Port, Gross Tons

Quotations, by Cable to Coal Age

	May 19	May 26†
Admiralty, large	40s.@42s.	41s.@42s.6d.
Steam, smalls	32s.6d.	30s.@32s.6d.
Newcastle:		
Best steams	32s.6d.	32s.6d.@34s.
Best gas	32s.6d.@35s.	32s.6d.@35s.
Best bunkers	34s.@35s.	33s.6d.@35s.6d.

† Advances over previous week shown in heavy type; declines in italics.



News Items From Field and Trade

ALABAMA

An active statewide movement is under way to have the state abandon the coal-mine contract labor of its convicts. It will be made a live issue in the summer session of the Legislature.

Three suits have been filed at Birmingham against the United Mine Workers asking damages aggregating \$900,000, the allegations being that the union directed the strike in the Alabama coal fields two years ago and that as a result of it interstate shipments of coal were interfered with and the coal companies lost large contracts. The plaintiffs in the suits, who ask \$300,000 each, are the Roden Coal Co., Cahaba Coal Co. and the Blocton Cahaba Coal Co. The trials have been set tentatively for October in the U. S. District Court at Birmingham.

ALASKA

The U. S. Geological Survey announces that surveys have been made of 16 of the largest mining districts, including all of the important coal fields of Alaska. The surveys cover a total of 5,000 square miles.

The Secretary of the Interior has authorized the building of a spur 4 1/2 miles long from the Matanuska branch of the Alaska R.R. to what are known as the Moose Creek coal mines in the Matanuska field. These mines contain a good quality of steam coal suitable for export and for use on the government railroad. The estimated cost of the new construction work is \$125,000 and the chairman of the Alaskan Engineering Commission estimates that it will save the railroad nearly the entire cost during the first year. Two areas now covered by government coal leases, upon which a large amount of money has been expended in preliminary development work, will be reached by the proposed spur. The cost of the improvement will be contributed in part by the coal-mining lessees.

COLORADO

The Colorado Fuel & Iron Co. hopes to reduce or stop the flow of gas into its Morley mine, in Las Animas County, by tapping a deposit of gas sand near the mine. So a well hole is to be drilled 3,000 ft. into the supposed location of the gas sand. Possibly the drill hole will draw upon the pressure of gas sufficiently to prevent the gas from leaking into the mine through a fissure.

ILLINOIS

Mine No. 2 of the Chicago-Sandoval Coal Co., located at Sandoval, opened May 15 and resumed production. The mine has been closed for a month.

The mine operated by the Spring Creek Coal Co., near Springfield, has been temporarily closed for repairs, as has also Victoria Collieries Co. mine at Tamaroa and Paradise Coal Co. mine at DuQuoin.

Consumers of electric power in the southern Illinois field deny that the recent strike of Central Illinois Public Service Co. line-men caused them any serious loss or inconvenience. Occasional brief shutdowns is all that any of them report. The strike is now settled.

The Bissell Coal Co. has closed down its mine at Bissell, in the Springfield district. There are now eighteen large mines closed in the Springfield district.

The Western Coal & Mining Co. will sink a new mine two miles north of Hurst, in the edge of Williamson County. This company is now operating Mine No. 2, employing 600 men. The new mine will be known as No. 3. It is said that the new mine will be larger than No. 2 and will employ more men. It is proposed to erect 150 houses for the miners near the new shaft.

Following a recent decision by the Illinois Commerce Commission, the Illinois Central R.R. will begin immediately to construct two and one half miles of track to connect with the Big Four road. The new branch of the I. C. will begin near the mine of the Dering Coal Co. between Eldorado and Raleigh and will connect with the Big Four tracks near Wasson. This branch is in

direct route of large coal mines in the vicinity and will be used largely for coal transportation purposes by the Illinois Central.

The city of West Frankfort, located in the center of the largest and richest coal field in Illinois, with eight large collieries as its principal industries, is fortunate in the fact that practically all of these mines have kept operating steadily and boasts of a semi-monthly payroll of all the mines of approximately \$260,000. The highest bi-weekly pay since the strike was \$360,000, and the average, \$300,000.

The coal severance tax bill now before the Illinois Legislature has been amended so that it provides a 2c. per ton tax at the mine instead of a tax of 8c. The bill has not been reported out of committee, however.

INDIANA

The Indiana Coke & Gas Co. was sued in the federal court at Indianapolis, Monday, May 16, by the Mississippi Valley Iron Co. of St. Louis, Mo., for \$1,750,000. The plaintiff alleges that the coke company delivered an inferior grade of coke, that deliveries were not made according to contract and that deliveries ceased before the expiration of the contract.

The Rader Coal Co. of Indianapolis is to provide the 1924 supply of No. 4 Indiana mine run for the Marion County tuberculosis hospital at Sunnyside, the county infirmary and the Marion County asylum for the incurable insane at \$2.40 a ton. This is \$1.05 a ton less than the price paid last winter by the county.

The Bloomington Block Coal Co. has been incorporated at Bloomington for the purpose of doing a mining business. The organizers are John S. Risher, Helen T. Risher and Ina R. Irvine.

Suit to obtain judgment of \$60,000 for damages was filed May 2 in federal court by the Worth-Husking Coal Co., of Chicago, against the Indiana Power & Water Co. and the Indiana Power Co. The plaintiff alleges that the defendant company broke a coal contract said to have been entered into on July 17, 1919, by the plaintiff and the Indiana Power & Water Co. providing for the shipment to the Worth-Husking Coal Co. by the Indiana Power & Water Co. of from 1,400 to 1,800 tons of coal a day from July 21, 1919, to March 15, 1920. The plaintiff alleges that the Indiana Power & Water Co. was taken over by the Indiana Power Co. on Nov. 15, 1919, and that the latter company failed to carry out the contract, shipping in all only 11,300 tons of coal. The original contract is said to have called for the shipment of 50,400 tons.

The Indiana Fuel Supply Co., of Indianapolis, has filed a preliminary certificate of dissolution.

H. C. Booth has been appointed receiver for the Black Comet Coal & Mining Co. in a suit filed by Edwin F. Daniels et al. on notes and to foreclose chattel mortgage and for the appointment of a receiver. The Black Comet Coal Co. owns electrical and other equipment in mines formerly operated by them, now leased by the Burr Oak Coal Co.

Because of the laxity in the mining industry in the Bicknell field, many of the miners' families are reported to be leaving for Detroit and cities in Ohio, where the automobile and tire business is booming. Recently the American No. 2 mine in the Bicknell field, employing about 450 men, and the Bruceville mine with about 400 men, were closed down indefinitely. Both Pan-Handle mines, which employ about 350 men, have been closed, and Freeman mine No. 2 was closed some time ago. Other mines in the Bicknell field have been working only about two days each week with the exception of Edwardsport, which has had good working time continuously.

IOWA

The Knoxville Mining Co., of Knoxville, will sink a shaft mine, instead of developing a slope mine, as was originally intended.

The Norwood-White Coal Co. has opened a new coal field consisting of about 1,000 acres between Herrold and Grimes. The

vein is about 200 ft. below the surface and varies from 4 to 6 ft. in thickness.

Tests which have been made in Cedar and Orange townships, near Albia, show a rich vein of coal at a depth ranging from 150 to 300 ft. Ten test holes have been sunk and it is expected that the tests will be completed by July 1. Edward Coyne, who is directing the tests, has about 3,000 acres of land under lease and has more land under privilege of lease if there is proved to be sufficient coal under the land to warrant leasing. The coal is about of the same quality as that mined by the Shuler Coal Co., near Alpha.

The Davis County Board of Supervisors has filed suit for \$250,000 against the Bloomfield Coal & Mining Co. for alleged damages to that amount sustained by the county hospital building, near Ankeny, as a result of mining operations.

Production of the mines of Iowa during 1922 was 4,679,683 tons, which included 2,350,582 tons of prepared lump, 1,599,864 tons of mine-run and 729,237 tons of slack. The mines operated but seven months because of a warm winter and the strike. There were 9,218 miners on the average in the Iowa mines, with other underground workers numbering 3,349 and 1,273 surface workers. The third district employed 13,840 of the total number and Polk county 1,883 men.

KANSAS

The Lively Mining Co., capitalization \$100,000, has been chartered in Kansas to operate a mine near Pleasanton, in Linn County. Work of sinking the first shaft will begin early in July. The incorporators are W. E. Lively and E. J. Lively, Pittsburg; G. T. Lively, Scammon; Mrs. A. C. Marlatt, Kansas City; and Woodrod Wilson, Denver, Colo.

The Fidelity Coal Co., composed of Joe E. DuBreuil, Oliver Barrett and John W. Cosby, all of Topeka, has purchased the Jackson-Walker Coal Co. and will be located at 619 East Eighth Avenue. Mr. DuBreuil has been manager of the Jackson-Walker Co. for the past two years.

KENTUCKY

The present term of the Perry County Circuit Court at Hazard will be largely taken up with the trial of Floyd and Monroe Kilburn, charged with shooting to death Frank Horn, superintendent of the Coneva Coal Corporation, at Cheviot last winter. Horn who was a former captain in the army and former sheriff of the county, was killed while endeavoring to break up liquor traffic on company property.

MARYLAND

C. W. Hendley & Co., of Baltimore, which has been in business since 1902, has been incorporated under the title of C. W. Hendley & Co., Inc. The officers of the new corporation are Charles W. Hendley, president; W. Winchester White, vice president and treasurer, and Samuel S. M. DuBois, secretary and general manager.

MINNESOTA

A report has been published that hard coal was struck by well diggers near Crookston, at a depth of 60 ft. Samples are in the hands of the University of Minnesota, but it is a safe guess that they will not reveal any anthracite.

O. P. B. Jacobson, of the state railroad and warehouse commission, will send out a recommendation to the coal trade, urging early buying of coal by consumers, to avert any trouble in the fall. It is based upon a wire from Herbert Hoover, Secretary of Commerce, on the subject, which included urging co-operation with the dock concerns in an organized step to secure and store coal for winter use.

MISSOURI

J. W. Alder, cashier of the Bank of Merwin, at Merwin, has taken leases on 2,600 acres of land between Merwin and Amoret, on the Kansas City Southern R.R., and several new coal mines will be opened in western Bates county.

The airshaft of the coal mine east of Hamilton caved in recently and it will require at least thirty days to repair the damage. The hole made by the cave-in is about 35 ft. in diameter and extends down to solid rock about 48 ft. below the surface.

The U. S. Bureau of Mines rescue car No. 6 has arrived at Moberly, and will remain there until June 2, when a mine-rescue dem-

onstration will take place. Rescue training classes have been instituted at Keota, Higginsville, Bevier and Huntsville. Alex J. Miller and T. R. Williams are in charge of the car. Governor Arthur B. Hyde, of Missouri, will be invited to Moberly when the rescue demonstration is given.

A dividend of 75c. per man per working day has been declared by the Co-operative Block Coal Co. of Macon, a large mine operated on a co-partnership by the miners. This dividend is declared from the profits above operating expenses and goes to each man as a sort of bonus over his \$7.50 per day wage. For each day put in by the miner he gets 75c. in excess of his stated earnings.

NEW JERSEY

Dr. Oliver Bowles, mineral technologist of the Bureau of Mines, has been designated by Secretary Work to be superintendent of the new mining experiment station of the bureau to be established at Rutgers College, New Brunswick, N. J. He will assume office July 1.

In a statement made public by former Senator Frelinghuysen Governor Silzer of New Jersey is urged to call a special session of the State Legislature in order to enact laws which will protect the people of New Jersey against suffering from a coal shortage during this coming winter. Senator Frelinghuysen attacks the inflated prices of coal and urges that additional remedies against the anthracite combination be enacted into law by Congress.

NEW YORK

The Stephens Fuel Co., of Bronx Borough, New York City, has taken a group life insurance policy covering each employee for \$1,000 and, in the case of salesmen and managers, for \$2,000, with a provision for free nursing service. Following this action by the Stephens Fuel Co. the Weber, Bunke, Lange Coal Co. took a similar policy.

Announcement has been made by the Berwind-White Coal Mining Co. of the withdrawal of its subsidiary, the Bermuda Bunkering Co., which has done a bunkering business in Bermuda. The modern coal-handling machinery and floating plant of that company will be operated in the future by William E. Meyer & Co. and John S. Darrell & Co. The recent conclusion of arrangements under which Meyer & Co. and Darrell & Co. will stock Berwind coal exclusively in the future has made it unnecessary to continue local operations. Bunkering by Berwind-White at Bermuda has averaged between 20,000 and 30,000 tons yearly. No figures were given in connection with the sale of the Berwind-White plant to the two British companies, which took it over jointly.

OHIO

The Nelsonville & Murray Coal Co., Nelsonville, has been incorporated with a capital of \$50,000 to mine and sell coal. Incorporators are M. P. Ohlinger, Walter Wolf, Gertrude Wolf, H. V. Wolf and Alice Ohlinger.

The Long Hill Coal Co., Nelsonville, has been chartered with a capital of \$25,000 to mine and sell coal in the Hocking Valley field. Incorporators are L. J. Eberle, R. S. Oxley, A. H. Schory, A. P. Amann and M. E. Voll.

The Hartz Coal Co., Dover, has been chartered with a capital of \$10,000 to mine and deal in coal as well as other minerals. Incorporators are George Hartz, John A. Hartz, Edna Hartz, Edward M. Hartz and Ed. C. Seikel.

PENNSYLVANIA

R. G. Skinner, a graduate of Cornell University and for a number of years connected with the Scranton Electrical Construction Co., has gone with the Scranton Electric Co. as assistant to Charles Dawson, who is the power solicitor and commercial engineer for the Scranton Electric Co.

N. H. Patton, of W. H. Patton & Associates, manufacturers' representatives, will in the near future transfer his residence from Philadelphia to Pittsburgh, where he will have charge of work in that territory.

The Philadelphia & Reading Ry. spends \$10,000,000 every year for fuel, according to Charles P. Dampman, head of the fuel conservation movement on the road. Engineers, firemen, yardmasters, car inspectors and other employees directly interested in the fuel problem from all parts of the division attended a meeting held at Reading recently. Mr. Dampman urged the saving of a shovelful of coal wherever possible

and quoted statistics to show that a saving would be effected if every fireman on the road would conserve a shovelful of coal daily. John Scheefe, road foreman of engines, also spoke and called the attention of the men to unnecessary black smoke, which is a big factor in fuel conservation.

Frank Wise, power engineer of the power department of the Scranton Electric Co., has transferred his connections to the American Gas & Electric Co. at Wheeling, W. Va., as power solicitor.

Conveyors Corporation of America, Chicago, Illinois, announce the appointment of the Pittsburgh Machine Products Co., Oliver Building, Pittsburgh, as district representatives. The Pittsburgh organization will handle sales in western Pennsylvania and the northwestern part of West Virginia.

The Glen Alden Coal Co. has increased the dividend rate on the common stock of the company by declaring a payment of \$2 a share on the issue, payable June 20 to stock of record June 1. An initial dividend of \$1.50 was paid on Dec. 20, last.

Shipments of coal from the Girard Estate properties in the anthracite district in 1922 were 2,050,257 tons, a decrease of 933,465 tons, or 31 per cent, according to the fifty-third annual report of the Directors of City Trusts, Philadelphia. The decrease was due to the anthracite miners' strike. The estate's proportion of the total shipment of anthracite coal from Pennsylvania in the year was 5 per cent, the highest since 1880; 344,607 tons of coal were reclaimed from culm banks in the year, 10,479 tons less than in 1921. Since 1889, when the reworking of culm banks was first taken up on the Girard Estate, 7,001,319 tons have been reclaimed from this source. During the sixty years of active mining on the Girard Estate there have been marketed from it 85,445,442 tons.

Sam Noble, who was elected check weighman and Joseph Petevage, who was elected check docking boss at a meeting of the No. 9 colliery local, of the Pennsylvania Coal Co. on May 14, resigned their jobs the next morning. George Hurry and John Pleasatine, their respective predecessors, made a demand on the local for an increase in pay to \$12 a day, it is said. They had been receiving \$8 a day from the miners for their work.

Joseph J. Jermyn's interests in the coal mining company of Jermyn & Co., which operates a colliery at Old Forge, have been sold to George B. Jermyn, E. B. Jermyn, Walter M. Jermyn, R. G. Jermyn and R. A. Downey. The change becomes effective on July 1, next. Jermyn & Co. acquired title to the mining property at Old Forge about thirty-five years ago. Ownership of the operations has remained in the family down through the years. The production of the colliery is from 1,200 to 1,600 tons of anthracite daily. At the present time the colliery is being operated to its maximum of production, with 800 men on the payroll.

The Commissioners of Schuylkill County have decided not to await the long legal suits against the coal companies that are refusing to pay taxes on the \$410,000,000 increased valuation on their lands, but have decided to use their power at once to enforce collections. This can be done by selling the personal properties of the companies and lands on which taxes have not been paid. Large tracts of land at Minersville already have been turned into the Commissioners and proceedings will be begun to sell these as well as others which will be reported within another week. The county officials say the coal companies not only are delinquent on a whole year's taxes, but they soon will be penalized for delinquency on a second year. It is believed that before the matter can be brought before Court an adjustment will be reached.

Claiming that all the men awarded back pay under a recent decision of Dr. Charles F. Neill of Washington, umpire of the Anthracite Board of Conciliation, had not been given the money said to be due them, the 1,050 employees of the Lattimer, Milnesville and Hollywood mines of C. P. Hardee Bros. & Co., Hazelton, struck May 23.

The Anthracite Conciliation Board on May 16, ordered the Hudson Coal Co. to eliminate a time check system, already in force at several Hudson collieries. Under the decision, which was written by Umpire Charles F. Neill, the company must immediately remove a check-in and out system at the East End and Baltimore No. 5 collieries, in Wilkes-Barre, as well as at the Marvine mine, in Scranton. Plans to put the same system of timekeeping at other Hudson operations are automatically stopped by the ruling. The decision is also important because in it the board declares the company has no "right to make any changes without the consent of the other

party." Fight against the check-in and out system was waged by District President Brennan since October, 1921, when the company first established the new time-keeping method at the Marvine.

Merger of four coal-producing companies under the name of the Irwin Gas Coal Co., with total assets of \$3,000,000 has been announced at Greensburg. The companies absorbed by the Irwin company are the Amend Coal Co., the Salem Gas Coal Co. and the Ninevah Coal Co. The merged company operates six mines with a daily output of 4,000 tons, four being located at Export and one each at Seward and Uniontown, all in the western Pennsylvania field. R. H. Jamison, of Greensburg, is president of the company.

State charters have been issued for the following companies: Inter-County Anthracite Co., Philadelphia, mining and dealing in coal, coke and coal lands; capital stock, \$5,000; E. A. Samsel, 4514 Osage ave., Philadelphia, treasurer; W. H. Gotwald, Schwenksville, and W. C. Jenkin, Philadelphia, incorporators. Briar Hill Coal Co., Butler; \$100,000; mining, preparing and shipping coal. The incorporators are Harry A. Gould, 106 Zeigler ave., Butler, treasurer; C. H. Gould, Ellwood City and C. F. Becker, Butler. Chickaree Coal Co., Ebensburg; \$25,000; mining and preparing coal for the market and dealing in coal lands. The incorporators are Murray J. Shiffer, Ebensburg, treasurer; William C. Shiffer and Clementine Shiffer, Ebensburg.

The Senate Finance Committee apparently is satisfied to allow the Department of Mines to remain as a separate unit of the state government. The Pinchot code originally provided that the department should become a bureau of the Department of Labor and Industry. This plan met with opposition and several weeks ago the code was amended so that the department remains as it is. The latest revised copies of the code were ready for the Legislature when it reconvened this week and while there were some minor changes in it, the Department of Mines was untouched.

TENNESSEE

Fire recently at the Cambria Coal Co. mine at Briceville, caused a loss of approximately \$70,000. The company will rebuild at once.

Reductions in the retail price of coal have been announced by dealers in Memphis. Practically all dealers are selling Kentucky lump coal, which formerly sold for \$8.75 a ton, for \$7 per ton, and Kentucky nut coal, which formerly sold for \$8.50 a ton, for prices ranging from \$6.50 to \$6.75 per ton. The reductions were said by several dealers to be a result of cheaper prices announced by the mines. The West Kentucky Coal Co. announced a cash price of \$6.75 on Tradewater lump coal and \$6.25 on Tradewater egg and nut.

UTAH

The trial of the men charged with the murder of a deputy sheriff in Carbon County during the strike last year is being held in Salt Lake City. It took four and a half days of strenuous examination of the veniremen to get a jury.

VIRGINIA

Directors of the Virginia Iron, Coal & Coke Co. resumed dividend payments May 24 on the common stock of the company with the declaration of a dividend of 2 per cent on the issue. The dividend was passed in June, 1922. The regular semi-annual dividend of 2½ per cent on the preferred also was declared, both payable July 2 to stock of record June 16.

WEST VIRGINIA

Organization of the Everett Coal Co., of Clarksburg, was perfected a few days ago by the election of the following officers: Karl G. Davis, president; J. A. Ferrel, vice-president; Dr. E. M. Pearcey, treasurer and Louis A. Carr, secretary. This company, having large holdings in Brooke County near Wellsburg, has completed arrangements for early development of its coal property.

At a sale held under a decree of the Circuit Court of Biason County R. B. Biddle and C. L. Thompson, of Philadelphia, purchased the property, equipment and assets of the United Coal Co. This company has been operating three mines in the vicinity of Gilmer, on the Charleston Division of the Baltimore & Ohio R.R., these mines being known as the Darnall, Kather-

line and Bracken mines. The purchasers have completed arrangements to operate under the name of the Quaker Coal Co. The same concern owns several hundred acres of coal land in Somerset County, Pa. Ernest G. Smith of Weston has been placed in charge of the mines at Gilmer as superintendent.

Charles R. Martin, of Binghamon, has been appointed manager of the Fairmont office of the Fairmont-West Virginia Gas Coal Co., recently organized by Robert Y. Brown, New York coal broker, to operate a mine recently acquired by Mr. Brown on the Binghamon branch of the Western Maryland. For a period of about nine years Mr. Martin was connected with the Jamison Coal & Coke Co., having been payroll clerk, assistant superintendent, chief clerk of the Fairmont office and for several years superintendent of the Binghamon, Fortney and Josephine mines of the Marlon Gas and Wyatt-Binghamon coal companies. Mr. Martin's successor at the mines just named will be S. L. Poole, who has been the mine foreman.

The MacEachen Company, recently organized by Washington people and chartered under the laws of West Virginia with an authorized capital stock of \$3,000,000, is given the right under its charter to manufacture mine-loading machines, mining machines and mine cars of all kinds, to own coal lands, operate mines and to erect power plants for the manufacture and sale of electric power. The new enterprise was incorporated by Roderick MacEachen and F. V. Murphy, of Washington, D. C.; Charles Wingerter, of Wheeling; J. W. Davison, of Grant Town, and H. E. Grau, of Fairmont. Mr. Davison is an official of the New England Fuel & Transportation Co. The company will have its principal office in Fairmont, W. Va., and will operate in Marion County.

Organization of the Sterling Black Mining Co. presages further development of coal lands in Boone County. This concern has been incorporated with 1,000 shares of no par value, the seat of operations to be at or near Altman, in Boone County. Among those interested in the new enterprise are G. W. Coyle, of Columbus, Ohio; Sam Brown, of Pittsburgh, Pa.; T. L. Johnson, Frank Kerns and T. F. Somerville, of Charleston.

It is understood that the New River and Pocahontas Consolidated Co. is negotiating for the plants and properties of the Ephraim Creek Coal & Coke Co., near Thayer, which adjoin those of the New River and Pocahontas company.

Since May 1 a large corps of civil engineers representing the Chesapeake & Ohio have been in the vicinity of Roncverte, W. Va., for the purpose of making a survey of the proposed branch line railroad of the Chesapeake & Ohio to the western Greenbrier coal fields.

T. L. Lewis, who at one time was head of the international organization of the United Mine Workers, but who in recent years has been the secretary of the New River Operators' Association, has resigned to devote his time to his own personal business. Mr. Lewis is now an operator as well as editor and owner of *The Coal Mining Review* and desires to devote his entire time to his mines and to the *Review*. He will, however, continue to act in advisory capacity to the New River association, it is announced. S. C. Higgins, who for several years has been the traffic manager of the association, will succeed Mr. Lewis as secretary of the association and will combine the office of secretary and traffic manager. The office of the secretary will be at Mt. Hope in the future.

The Fort Clark Coal Co. resumed operations at its mine between Lost Creek and Mont Clare in Harrison County on May 15, after an idleness of eight months. This company has just negotiated a fuel contract which will furnish employment to every man usually employed at the mine. This company normally employs about 75 miners.

The Raleigh Coal & Coke Co. is engaged in building a road from the company's offices at Raleigh to an intersection with the county road near the Raleigh Coal & Coke Co. station. A 12-foot road is being constructed under the same specifications as are used for county and state highways. The piece of road to be built will cost approximately \$10,000.

The American Coal Co., which operates the Pinnacle, Piedmont and Crane Creek operations in Mercer County, has put into commission buses for the use of miners and their families. The buses operated on schedule will accommodate from eighteen to

twenty persons and will be used to take the miners to and from their work. The company, the first to provide buses for employees, will not charge the men any fare. The announced purpose of the company in using buses is to encourage the miners in working more steadily.

The Fairmont & West Virginia Coal Co., organized by Robert Y. Brown and others and with general offices in New York, Pittsburgh, Cleveland and other cities, will open an office in Fairmont, following its purchase of a mine in the Fairmont region. The company a little earlier in the month purchased the Shadybrook mine of the Banner Coal Co. on the branch line of the western Maryland Ry. Offices are to be secured in the Bethlehem Building. Harry MacAlarney, of Ebensburg, will be the manager of the Fairmont branch of the company. A. L. Black, superintendent. It is planned by the purchasing company to increase the capacity of the plant from seven cars a day to 25 cars a day.

Howard N. Eavenson, formerly with the United States Coal & Coke Co., and now a consulting engineer of Pittsburgh, has in association with other Pittsburgh people organized the Pittsburgh Coal Land and Railroad Co., the headquarters of which are at Pittsburgh. This company is capitalized at \$100,000. Associated with Mr. Eavenson in the new enterprise are Newell G. Alford, J. R. Hicks, B. K. Folger, all of Pittsburgh, Pa.

The Atlas Coal & Coke Co. of Chicago, Ill., has been authorized by the secretary of state to hold property and transact business in West Virginia.

The following West Virginia coal companies have been dissolved as corporations: Ohio Wheeling Coal Co., Will-Earl Coal Co. and the E. L. Sternberger Coal Co.

I. K. Dye, well known in coal circles in northern West Virginia, has been appointed secretary of the Elkins Chamber of Commerce.

The Fairmont & Cleveland Coal Co. has purchased 125 acres of coal land from the Connellsville & Fairmont Coal Co., on Teverbaugh Creek near Worthington. The tract just acquired is a portion of 1,000 acres originally sold to the Connellsville & Fairmont Coal Co., which is operated by K. K. Kramer and associates of Connellsville, Pa. The coal in the tract acquired is in the Sewickley seam and has not heretofore been developed.

The Pocahontas Fuel Co. will soon open another mine in the Wyoming County field, not far from the Itmann mine in Wyoming County, on the line of the Virginian Ry. In order to afford shipping facilities for the new mine it will be necessary for the Virginian to extend its line. There are about 2,000 acres in the tract which the Pocahontas company will begin to develop. The same company is making extensive improvements at Pocahontas, having begun the erection of a number of dwellings for the use of company officials and the clerical force of the company. The building program undertaken is with a view to relieving the housing shortage at Pocahontas.

The Reese Creek Coal Co. is a new concern just launched by Milton people, having a capital stock of \$50,000 and with headquarters at Milton. Interested as incorporators of the new enterprise are Robert J. Lockett, H. C. Heck, V. L. Hall, Lucia C. Heck and Josye H. Hall, all of Milton.

The Burger Coal & Coke Co. and the Northern Fuel Co. have been organized by the same people. Headquarters of both concerns are to be at Wheeling. The first-named company is capitalized at \$25,000 and the latter at \$100,000. Both concerns will engage in the coal business in the Northern Panhandle of West Virginia. Active in organizing both enterprises were A. E. Bryant, Nell Moran, A. S. Burger and H. L. Arbenz, of Wheeling.

WASHINGTON, D. C.

The order of the District of Columbia Court of Appeals in remanding to the District Supreme Court the case of the McAlester-Edwards Coal Co. with directions to issue a writ sought by the company to compel the officials of the Chickasaw and Choctaw tribes of Indians to recognize a patent for surface lands in Pittsburgh County Okla., was approved by the U. S. Supreme Court in a decision rendered May 21. The company operates a coal mine in Pittsburgh County. Under an act of Congress of Feb. 8, 1918, surface lands were set aside for patent where mines were operated under legal leases on Indian lands, operating companies being given priority. The McAlester-Edwards company filed for surface rights

and \$2,291 was accepted as part payment. Officials of the tribe refused to accept \$10,360 tendered by the company as the balance of the purchase price fixed by appraisal, contending that the Secretary of the Interior had misinterpreted the act. The company petitioned the District of Columbia Supreme Court for a writ to compel acceptance and issuance of the patent. That court sustained a demurrer, which the Court of Appeals reversed, the latter court being upheld by the U. S. Supreme Court.

WISCONSIN

Joseph W. Simpson has been elected president of The Milwaukee-Western Fuel Co., Milwaukee, effective May 10, 1923.

CANADA

Coal mine officials' examinations, as provided under the coal Mines Regulation Act of British Columbia were scheduled for May 29, 30 and 31, at Merritt, Nanaimo, Cumberland and Fernie.

The installation of coal bunkers on the waterfront of the harbor of the City of Vancouver is proposed by a coal mining company of the Province of Alberta, the intention being to make a bid for the mercantile requirements of that growing Pacific Coast port.

F. W. Glover, who has been superintendent of the collieries of the Princeton Coal & Land Co., Nicola-Princeton District, has been appointed general manager. It is reported that the coal property has been taken over by English interests, that the measures are to be developed more intensively than heretofore, and that production soon will be materially increased.

Coal-mine operators and the businessmen of the province of Alberta generally are disappointed that a greater reduction in freight rates has not been offered by Sir Henry Thornton, president of the Canadian National Railways, in order to permit the development of the market of Ontario for Alberta coals. It has been agreed that the rate shall be \$9 a ton as against the present rate of \$12.50 a ton from Edmonton to Toronto.

The Trades and Labor Council of Vancouver Island thinks the time has arrived when organized labor should urge upon the authorities the need for a more stringent enforcement of mine regulations, to still further safeguard the men employed in coal mines in the province. The council at a recent meeting expressed its dissatisfaction with the finding of the commissioner investigating the recent accident in the Canadian Collieries (Dunsmuir) Limited, No. 4 mine, at Cumberland, and blamed the operators for not keeping a sufficient volume of air moving in the mines. It was decided to get in touch with labor organizations on the mainland, with a view to enforcing the Coal Mines Regulation Act upon the operators as well as the men.

The strike at the Blackstone mine, at Foothills, Alta., has been settled by the men agreeing to resume work at \$7.50 per day, without any signed contract. The strike began on March 31, when the mine owners refused to renew the agreement with the United Mine Workers. The settlement, it is understood, includes the Foot Hills Collieries.

The new budget announced in the Dominion House of Commons by the Hon. W. S. Fielding, on May 11, provides for a duty of 0.3c. to 0.6c. per gallon on petroleum not in its natural state and of a specific gravity heavier than 0.79. Crude petroleum remains on the free list. This tariff has been imposed at the insistence of the coal miners and coal operators of Vancouver Island, who have been backed by their local members to the Dominion Parliament and by the Provincial Minister of Mines. The new tariff has been aimed against fuel oil, which has been imported in large quantities to the British Columbia coast cities. Whether the coal interests which have been lobbying for this new tariff will benefit by it to the extent that they anticipate seems problematical. Consumers have become weary of high miners' wages and high prices for coal, and there has been an enormous development of hydro-electric power throughout the province to replace power plants previously driven by steam. So far as the bunkering of oil-burning steamers is concerned, it is likely that the duty will be avoided by bunkering at United States, instead of British Columbia, ports. In the new tariff the free importation of anthracite is to be amended to include lignite.

Traffic News

An important precedent is involved in the case of the Smokeless Fuel Co., Inc., versus the Norfolk & Western Ry., counsel for the carrier declare. "Conditions similar to those which existed in the spring of 1920," says the brief for the carrier, "and which led to the establishment of the Lamberts Point Coal Exchange, may arise again—indeed are believed by some to be in sight already. If so, it might be most expedient to revive the pooling arrangements to relieve those conditions and any rulings now made by the commission necessarily will have great influence upon the renewal of such arrangements."

Announcement was made at Pineville, Ky., on May 4, by Don Price, assistant to O. B. Hollingsworth, division superintendent of the Louisville & Nashville R.R. at Middlesboro, of plans for immediately starting work on double tracking 40 miles of road from Pineville to Harlan, which would result in the entire Cumberland Valley division from Corbin to the heart of the coal fields being double tracked, giving the road capacity for handling all the coal that can be loaded at the mines now in operation and for some years to come. Double tracking beyond Harlan is not deemed necessary as the road branches there into the Poor Fork branch going to Benham and Lynch.

The report of the Delaware & Hudson R.R. Co., which has just celebrated its 100th anniversary, shows that during 1922 there were produced by the affiliated corporations of the company, including the product of the washeries, 4,423,864 gross tons of coal, a decrease of 4,698,544 tons, or 52 per cent when compared with 1921, or, according to the report, 11 per cent of the year's total output of the Pennsylvania anthracite mines and washeries. The gross operating revenues of the company for 1922 amounted to \$37,823,256, which is \$7,953,603 less than in the previous year, due, according to President L. F. Loree, to the national strike of the United Mine Workers, general and miscellaneous reductions in freight rates ordered by the Interstate Commerce Commission and the increased divisions of 15 per cent allowed most of the New England railroads. Notwithstanding decreased rates and divisions, earnings from freight transportation, exclusive of anthracite and bituminous coal, increased \$847,362, or approximately 6 per cent. President Loree also states that it cost \$2,800,000 to keep the mines in condition during the strike, such as operating the boiler plants, pumping, and ventilation. Among the items included in the decrease of \$3,219,476 in operating expenses for the year as compared with 1921, Mr. Loree cites the decrease of about \$491,000 in the cost of fuel consumed. Revenue from coal transportation during 1922 was \$15,276,651.47, as compared with \$24,876,088.55 in 1921. The company owns 322,416 shares of stock of the Hudson Coal Co., \$50 par value, valued at \$16,120,800, and 15,000 shares of the stock of the Northern Coal & Iron Co., par value \$100, valued at \$1,500,000.

During 1922 there were shipped through the Panama Canal, from the Atlantic to the Pacific, 386,922 tons of coal, as compared with 539,536 tons in 1921, a decrease of 152,614 tons. Of this amount 120,417 tons came from the United States and 217,187 tons from the British Isles. South America received 167,984 tons of the coal, Australia, 51,472 tons, Hawaii, 17,294 tons and Canada 6,016 tons. During the same twelve months 43,423 tons of coke passed through the Canal to the Pacific Ocean. The British Isles was the source of 31,117 tons, and the United States furnished 4,578 tons of the total. Of this tonnage 28,164 tons went to South America, 1,228 tons to Australia and 100 tons to Canada. Australia shipped 136 tons of coal to the "east coast of the United States" during the year.

The Missouri-Illinois R.R. has asked for authority to publish rates on coal to stations on the Mississippi River & Bonne Terre Ry., St. Francois County R.R. and the St. Louis-San Francisco Ry. via routes other than the established routes without observing the provisions of the fourth section of the Interstate Commerce Act.

On account of accumulation an embargo was placed May 11 by the Boston & Maine R.R. on all carload freight from the New York Central R.R. at Rotterdam Junction and Troy, N. Y., for movement to and via the Boston & Maine, except livestock, perishable and railroad supplies, including company fuel.

Argument before the full Interstate Commerce Commission of the case of the Chi-

cago Coal Merchants Association vs. the Atchison, Topeka and Santa Fe Ry. will take place in Washington June 12. The case of the Winding Gulf Colliery Co. vs. the Chesapeake & Ohio R.R., the hearing of which was assigned for July 13 at Charleston, W. Va., before Interstate Commerce Commissioner Examiner T. J. Butler, has been cancelled and the case reassigned for June 18 at Washington before Examiner W. H. Wagner.

Freight rates applicable on buckwheat and barley sizes of anthracite from Hudson Pa., to Pompton Lakes, N. J., have been found unreasonable in an opinion handed down by the Interstate Commerce Commission. The rates were assailed by the E. I. duPont de Nemours & Co. and were unreasonable, the Commission holds, to the extent that they exceeded \$1.80 per gross ton prior to Aug. 26, 1920, and to the extent that they exceeded \$2.52 per ton on and after that date. Reparation was awarded.

Questions involved in the case of the Valley Camp Coal Co. vs. the Baltimore & Ohio R.R. will be considered at an Interstate Commerce Commission hearing at Cleveland, June 18. Examiner Donnelly will preside.

On account of an accumulation the New York, New Haven & Hartford R.R., on May 22, embargoed all freight for public delivery on tracks of the Union Freight Railroad at Boston, Mass.

Obituary

Henry Woodland, secretary-treasurer of the Allis-Chalmers Co. of Milwaukee, Wis., died of cerebral hemorrhage May 14 at his home in Milwaukee. He took sick the afternoon before. Prior to his going to Milwaukee in 1901, Mr. Woodland had been with the Gates Iron Works of Chicago. For years he had been well known in the machinery industry.

William Goodridge Evans, aged 36, died of pneumonia at his home in Pittsburgh on May 16. He was assistant to the president of the Harris Pump & Supply Co. Mr. Evans was born in Shenandoah.

Thomas B. Brown, foreman at the Virginia mine of the Lacey Coal Co., Millsboro, received injuries on May 15 from which he died later in the day. Mr. Brown was 65 years old and had been a mine foreman for 30 years. He was in the act of placing the haulage rope over a sheave wheel when injured.

Publications Received

"Modern Byproduct Coking and the Koppers Company's New Combination Oven," a paper by Joseph Becker, read before the meeting of the Eastern States Blast Furnace & Coke Oven Association in Buffalo, Oct. 5, has been printed in booklet form, with illustrations. Mr. Becker is a consulting engineer of the Koppers Co., Pittsburgh, which is publishing the paper.

Map of the bituminous coal region of Pennsylvania showing inspection districts and location of mine-rescue stations, with type of appliances used. Mine Safety Appliances Co., bulletin No. 83.

Natural-Gas Manual for the Home, by R. A. Cattell. Bureau of Mines, Washington, D. C. Technical paper 325; 30 pp.; 6x9 in.; illustrated. Contains information on how efficiency in the production and utilization of fuels may be increased and waste prevented. The manual has been prepared for those who use natural gas in their homes.

Approximately 250 cases, illustrating many phases of the questions involved in the relations of employers and employees, are presented in Bulletin 309, "Decisions of Courts and Opinions Affecting Labor, 1921," recently published by the U. S. Bureau of Labor Statistics.

The printed digest of the proceedings of the Trunk Line mileage scale hearing, held in New York, Oct. 23-27, 1922 (including necessary exhibits), is now ready for distribution by the State Law Reporting Co., New York City.

Economic Combustion of Waste Fuels, by David M. Myers. Bureau of Mines, Washington, D. C. Technical paper 279; 51 pp.; 6x9 in.; illustrated.

Annual Report of Director of the Bureau of Foreign and Domestic Commerce for fiscal year ended June 30, 1922. Pp. 144; 6x9 in.

Coming Meetings

Iron and Steel Exposition at Buffalo, N. Y., Sept. 24-28. Association of Iron and Steel Electrical Engineers, Empire Building, Pittsburgh, Pa.

The American Wholesale Coal Association will hold its annual convention June 12 and 13 at the Gibson Hotel, Cincinnati, Ohio. Secretary, G. H. Merryweather, Union Fuel Bldg., Chicago, Ill.

Illinois and Wisconsin Retail Coal Dealers' Association will hold its annual meeting June 12-14 at Delavan, Wisconsin. Secretary, I. L. Runyan, Great Northern Building, Chicago, Ill.

Southwestern Interstate Coal Operators' Association will hold its annual meeting June 12 at Kansas City, Mo. General Commissioner, W. L. A. Johnson, Kansas City, Mo.

New England Coal Dealers' Association will hold its annual meeting at Providence, R. I., June 13-15. Secretary, C. R. Elder, Boston, Mass.

National Retail Coal Merchants' Association will hold its sixth annual convention June 25, 26 and 27 at Scranton, Pa., with headquarters at the Hotel Casey.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine-Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., June 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

National Coal Association will hold its sixth annual convention June 19-23 at Atlantic City, N. J. Assistant secretary, C. C. Crowe, Washington, D. C.

Retail Coal Dealers' Association of Texas will hold its eighteenth annual convention at Galveston, June 11 and 12. Secretary, C. R. Goldmann, Dallas.

The American Institute of Mining and Metallurgical Engineers has accepted the invitation extended by the Ministers of Mines of Ontario and Quebec and by the Canadian Institute of Mining and Metallurgy to hold its autumn meeting in Canada. The meeting will start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary, F. F. Sharpless, 29 West 39th Street, New York City.

The Illinois Mining Institute will hold its summer meeting on board a boat on the Illinois River, cruising between St. Louis, Mo. and La Salle, Ill., June 7-9. Secretary, Martin Bolt, State House, Springfield, Ill.

West Virginia Coal Mining Institute has set June 12 and 13 for its annual meeting, to be held at Hotel Waldo, Clarksburg, W. Va. Secretary, R. E. Sherwood, Charleston, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the National Exposition of Mines and Mining Equipment, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Ninth National Exposition of Chemical Industries at the Grand Central Palace, New York City, week of Sept. 17. Manager, Charles F. Roth, Grand Central Palace, New York City.

The Engineering Section of the National Safety Council will hold its second meeting of the year on June 12 in the Board of Commerce Building, Detroit, Mich., in co-operation with the Detroit Safety Council.